10-3930-256-20

TM 10-3930-256-20

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK, LIFT, FORK, ELECTRIC

SOLID RUBBER TIRES
6000-POUND CAPACITY

ARMY MODEL MHE-198
BAKER MODEL FTD-060-EE
FSN 3930-724-4057 (130-IN. LIFT)
FSN 3930-724-4059 (172-IN. LIFT)

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1965

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CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *7 February 1980*

Organizational Maintenance Manual

TRUCK, LIFT, FORK, ELECTRIC, SOLID RUBBER TIRES, 6000 POUND CAPACITY, ARMY MODEL MHE-198, BAKER MODEL FTD-060-EE, NSN 3930-00-724-4057 (130-IN. LIFT), NSN 3930-00-724-4059 (172-IN LIFT).

TM 10-3930-256-20, 4 May 1965, is changed as follows:

Page 10. Add Warning before paragraph 13.

WARNING

Insure that static electricity discharge straps are installed on the forklift truck and are in good condition. Failure to use the straps could result in the generation of a spark which could ignite explosives or flammables.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Organizational maintenance requirements for Warehouse Equipment.

TECHNICAL MANUAL
No. 10–3930–256–20

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *4 May 1965*

Organizational Maintenance Manual

TRUCK, LIFT, FORK, ELECTRIC, SOLID RUBBER TIRES, 6,000-POUND CAPACITY, BAKER MODEL FTD–060–EE, ARMY MODEL MHE–198, FSN 3930–724–4057 (130-INCH LIFT) FSN 3930–724–4059 (172-INCH LIFT)

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

These instructions are published for the use of personnel responsible for organizational maintenance of truck, lift, fork, electric, solid rubber tires, 6,000-pound capacity Baker model FTD–060–EE, Army model MHE–198, Federal stock No. 3930–724–4057 (130-in. lift), and Federal stock No. 3930–724–4059 (172-in. lift), procured under Contract No. DSA–4–020628–MP302.

2. Appendixes

Appendix I is a list of current references. Appendix II contains the maintenance allocation chart. The organizational repair parts and special tool lists are published in TM 10–3930–256–20P.

3. Maintenance Forms, Records, and Reports

The maintenance forms, records, and reports to be used in organizational maintenance of this truck are listed and described in TM 38–750.

4. Reporting of Equipment Manual Improvements

The direct reporting of errors, omissions, and recommendations for improving this manual by the individual user is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding General, U.S. Army Mobility Equipment Center, ATTN: SMOME–MMP, 4300 Goodfellow Boulevard, St. Louis Mo. 63120.

5. Orientation

Throughout this manual, the terms *right, left, front* and *rear* indicate directions from the viewpoint of the operator sitting in the seat of the truck.

Section II. DESCRIPTION AND DATA

6. Description

a. General. Refer to TM 10–3930–256–10 for a more general description of the truck.

b. Truck. Power for travel, lifting, and steering is by a 36-volt battery. The travel system includes a motor, motor controls, and a power axle assembly, to provide four speeds forward and reverse. The truck may be equipped with either of two lift heights. Lifting mechanisms are similar, except for certain dimensions for each lift height. The lifting mechanism consists of an electric motor, pump, controls, reservoir, lift and tilt cylinders, mast assembly, and forks. Hydraulic service brakes, and both hand and automatic parking brakes are used. If the motor directional control lever position is reversed while the accelerator is depressed, the circuit to the travel motor is broken. If the motor control is reversed while traveling in first or in second speed, the vehicle will slow down, stop, and then reverse.

c. Power Axle and Motor Assembly. The power axle and motor assembly consists of the travel motor, coupling, power axle with differential, axle shafts, final drive gears, and wheels. Power is transmitted direct from the travel motor through a bevel gear and pinion in the axle, through the axle drive shafts, final drive gear and wheels.

d. Control System. The travel motor power and vehicle speed and direction are regulated by a system which includes a contactor, accelerator master assembly, directional switch, and resistor providing four speeds forward or reverse. A manually operated directional control on the steering column support bracket energi-

zes the accelerator master assembly with a circuit made and broken by the contactor. A foot accelerator operates through the accelerator master assembly to select, in sequence, any one of four speeds. Resistors are used in the travel motor circuit to control the speed of the truck.

e. Steering System. The steering system includes a recirculating ball type power steering gear mounted at the front of the truck, connecting linkage with steering bellcrank, tie rods and steering knuckles mounted on the trailing axle.

f. Brake System. The brake system consists of a mechanical parking brake and a hydraulic footbrake. The mechanical brake operates on a drum keyed to the rear of the travel motor armature shaft. This brake is applied either by a handle on the steering column, or automatically through spring action as the driver rises from the seat. The hydraulic brake is a conventional automotive type system effective only on the front (drive) wheels.

g. Mast Assembly. The mast assembly used with either lift height consists of four main assemblies as follows:

(1) *Outer upright assembly.* The outer upright assembly is a welded one piece assembly that is mounted on the frame assembly. It incloses the lift cylinder and inner upright assembly.

(2) *Inner upright assembly.* The inner upright assembly is a welded one piece assembly that is mounted within the outer upright assembly. The lift cylinder, mounted in the base of the outer upright assembly, is secured through the top of the inner upright assembly. The inner upright assembly is raised or lowered by action of the hoist cylinder.

(3) *Crosshead assembly.* The crosshead assembly is mounted over the lift cylinder. Chains are attached to the lift carriage assembly, roll over the crosshead assembly and are secured to the lift cylinder. As the cylinder rises, the crosshead assembly rises, tightening the chains and raising the lift carriage assembly.

(4) *Lift carriage assembly.* The lift carriage assembly rides on four rollers within the inner upright assembly, which in turn slides up and down inside of the outer upright channels. Two forks are mounted on the front of the lift carriage assembly for handling of loads.

h. Lift Hydraulic System. The hydraulic system consists of a reservoir, pump, control valve, lift and tilt cylinder and hydraulic hoses. The lift cylinder raises the lift carriage and forks by hydraulic pressure supplied by the pump, and lowers them by gravity.

i. Lift Cylinder. A compound lift is used on this vehicle. The lift carriage rises to the top of the outer upright before the inner upright, together with the lift carriage move upward in the second stage. This is achieved by a dual hydraulic lift cylinder assembly with two pistons working in sequence on trucks rated for 130-inch lift height, or by a single stage lift cylinder on trucks with 172-inch lift.

j. Tilt Cylinders. The tilt cylinders are double-acting. The uprights are tilted in and out by hydraulic pressure as necessary, to pick up and carry loads.

k. Electrical System. The electrical system is a two-wire, no-ground type. The battery is connected into the circuit by means of a removable connector. The charging connection is also made through this connector. The weight of the operator in the driver's seat closes the circuit to the accelerating switch by an interlock switch. Travel control is through the accelerating master assembly, with circuit made and broken by contactor. The direction of travel is selected by the directional switch lever on the steering column. Resistors in the motor circuit control the speed of the truck. The stoplight and taillight is inclosed in a guard on the rear of the truck. The headlight, mounted on the right side of the hoist upright, is controlled by a toggle switch on the instrument housing.

l. Battery. The 36 volt battery (Government-furnished equipment) may be lead-acid or nickle-iron-alkaline. It will be located in the battery compartment and connected into the electrical system of the truck by a battery connector. The battery compartment dimensions are $30\frac{13}{16}$ inches long by $39\frac{1}{2}$ inches wide and 25 inches high.

m. Accelerator Master Assembly. The accelerator master assembly used for controlling truck speed is a pedal operated pilot device, to control magnetic contactors (relays) which in turn select speed control resistance values to control the travel motor of the truck. It provides four individual speeds and has time delay acceleration and plugging control. The accelerator master assembly is located under the truck floor plate.

n. Directional Switch. The directional switch selects "forward" or "reverse" operation of the travel motor. This switch is a three position (OFF-FORWARD-REVERSE), manually operated, two-circuit pilot device. The directional switch is located on the steering column support bracket.

o. Relays. The relays make and break the circuits in response to related manual and automatic controls. These relays are mounted in the electrical equipment box, inside the cowl.

p. Travel Motor. The travel motor, under the truck floor plate, is a series wound, direct current electric motor. Connected to the power axle, it drives the truck forward or backward.

q. Hydraulic Pump Motor. The pump motor for the upright hydraulic system is controlled by a switch which closes the pump motor relay. The switch is operated by either the lift or tilt control, starting the pump motor when the lever is moved about one-quarter of its travel toward lift or tilt positions. The switch is opened when lever is returned to neutral position. The pump motor is a series wound, direct current motor, directly coupled to the hydraulic pump.

r. Steering Pump Motor. The steering pump motor is controlled by a switch which closes the circuit when the operator is in the driver's seat. It is in continuous operation while the operator is seated.

s. Resistors. The fixed, tapped resistors which control truck speed are located in a compartment on the left side of the truck. The travel motor controls select as much resistance as required, by connecting sections of the resistors in series with the travel motor circuit.

t. Hourmeter. The hourmeter is the only instrument used on this truck. This meter automatically records the number of hours the truck has been in operation.

7. Tabulated Data

a. Electrical System.

Type	Type EE, spark inclosed, two-wire, ungrounded.
Voltage	36 volts dc
Battery	Government-furnished equipment.
Traveling motor:	
No load draw	100 amps
Full load draw	120 amps
Hydraulic pump motor:	
No load draw	120 amps
Full load draw	240 amps
Power steering pump motor:	
No load draw	25 amps
Full load draw	75 amps

b. Manufacturer's Identification.

Nomenclature	Truck, lift, fork, electric, solid rubber tires, 6000 pound capacity, Army model MHE–198.
Manufacturer	Baker Industrial Trucks, Division of Otis Elevator Company.
Capacity	6,000 lbs
Model	FTD-060
Contract number	DSA–4–020628

c. General

Gross vehicle capacity	6,000 lbs at 24 in. load center.
Maximum speed (empty)	5.4 mph
Maximum speed (loaded)	5.1 mph
Gradeability	15 percent with max load

d. Shipping Dimensions. Refer to TM 10–3930–256–10.

e. Hydraulic System.

Main pump output	6.4 gpm (gallons per minute) at 1,000 psi and 1,200 rpm.
Relief pressure (valve)	1,800 psi

f. Battery (Government-furnished equipment).

Voltage	36 volts
Type	Lead-Acid or Nickel-Iron

g. Hydraulic Pump Motor.

Manufacturer	General Electric Co.
Type	BT

h. Control Valve.

Manufacturer	Parker Hannifin Co.
Model	VDP11PD

i. Directional Switch.

Manufacturer	Square D Company
Type	CD–2A
Class	8963

CHAPTER 2
SERVICE UPON RECEIPT OF TRUCK

8. General

When a new truck is received by an organization, it must be serviced as described in paragraphs 9 and 10 by organizational maintenance personnel.

9. Removal of Preservatives

a. Remove tape, paper, or other packing. Use extreme care when unpacking and installing separately packaged components.

b. Remove with SD (solvent, drycleaning) preservative compound from exposed metal surfaces. Because this compound is not a lubricant, take special care to see that it is completely removed from all wearing surfaces.

c. Fill drive axle and hydraulic tank with proper lubricant as indicated in lubrication order (para. 11).

d. Refer truck to direct support maintenance for installation of battery retaining items shipped loose with truck.

10. Maintenance Inspection and Tests

a. The organization mechanic will perform the services and tests that are listed and described in figure 3. The services performed at this time will begin the cycle of regularly scheduled preventive maintenance services.

b. The deficiencies and shortcomings noted, and the corrective action taken will be reported on the appropriate forms prescribed and explained in TM 38–750.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION

11. General

10–3930–256–20 prescribes lubrication maintenance of the truck; compliance with the instructions is mandatory at all levels of maintenance. The order includes lubrication instructions for normal and abnormal conditions and temperatures. If a truck is received without a lubrication order, the using organization must requisition a lubrication order through normal channels in accordance with AR 310–1.

12. Illustrations

The lubrication order is illustrated in figure 1. The numbers that have been inserted on the border of the illustration refer to specific lubrication points that are pictured in figure 2 and called out by numbers 1 through 20.

LUBRICATION ORDER

LO 10-3930-256-20

5 APRIL 1965

TRUCK, LIFT, FORK, ELECTRIC, SOLID RUBBER TIRES, 6,000 LBS CAPACITY, 130 IN LIFT, AND 172 IN LIFT, (BAKER MODEL FTD-060-EE, ARMY MODEL MHE 198)

Reference C9100-IL

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

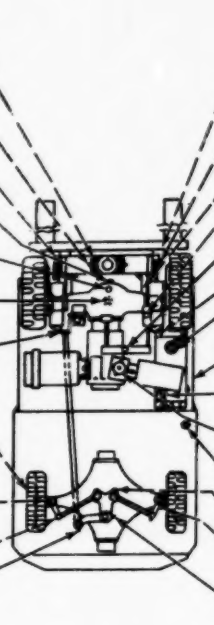
Lubricate points indicated by dotted arrow shafts on both sides of equipment.

Drain gearcases when hot. Fill and check level.

A dotted circle indicates a drain below.

FOLD

	LUBRICANT	INTERVAL
1 Lift Chain (Clean and coat)	OE	250
2 Crosshead Bearing (Sparingly)	GAA	250
3 Uprights (Brush on Mating Surfaces)	GAA	250
4 Drive Axle Level Plug (Check and maintain level)		50
5 Drive Axle Fill Plug (See note 1)	GO	
6 Drive Axle Drain Plug (Drain and refill)		1000
7 Steering Rod End (Sparingly)	GAA	250
8 Wheel Bearings (Remove wheel, clean, inspect and lubricate bearings, and reassemble)	GAA	1000
Spindle Pin Thrust Bearing (To be lubricated by direct support maintenance)		
18 Tie Rod End	GAA	250
7 Steering Rod End (Sparingly)	GAA	250



INTERVAL	LUBRICANT	
		Carriage Rollers (To be lubricated by direct support maintenance).
250	GAA	9 Tilt Cylinder Rod End (Sparingly)
250	GAA	10 Mast Pivot Bearing (Sparingly)
50	HB	11 Brake Master Cylinder (Check and maintain level)
250	GAA	12 Brake Cross Tube (Sparingly)
250	GAA	13 Tilt Cylinder (Sparingly)
	OE	14 Hydraulic Oil Tank Fill Cap (See Note 2)
50		15 Hydraulic Oil Tank Level Plug (Check and maintain level)
1000		16 Hydraulic Oil Tank Drain Plug (Drain and refill) (See note (4)
50	OE	17 Power Steering Pump (Fill and check level) (See key)
1000		Hydraulic Oil Filter (Change Element)
250	GAA	18 Tie Rod End (Sparingly)
250	GAA	19 Spindle Pin (Sparingly) (2 fittings)
250	GAA	20 Bellcrank (Sparingly)

FOLD

MEC 3930-256-20/1 ①

Figure 1. LO 10-3930-256-20.

— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to −10°F	0°F to −65°F	
OE – Oil, Engine, Heavy Duty					
Power Steering Reservoir	1 qt	OE 10 or 9110	OE 10 or 9110	OES	
Hydraulic Oil Reservoir	42 qt				
Oil Can Points					
OES – Oil, Engine, Sub-zero					
GO – LUBRICATION OIL, Gear Drive Axle	13 qt	GO 90	GO 90	GOS	Intervals given are in hours of normal operation
GOS – LUBRICATION OIL, Gear, Sub-zero					
HBA – HYDRAULIC FLUID, Automotive Brake Cylinder Sub-zero		HB		HBA	
GAA – GREASE, Automotive and Artillery		All temperatures			

FOLD FOLD

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW-10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT dry-cleaning. Relubricate with lubricants specified, in the key for temperatures below -10°F.

2. HYDRAULIC SYSTEM. After refilling system, operate lift 5 minutes, check level and bring to full mark. Always check level with forks lowered and mast tilted back.

3. OIL CAN POINTS. Every 50 hours lubricate mast pivots, seat brake and hand brake linkage, accelerator pivots, battery rollers and all adjusting threads with OE.

4. Every 1000 hours, remove access plate, drain hydraulic tank; remove and clean filter screen.

A copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE
SECRETARY OF THE ARMY:

HAROLD K. JOHNSON
General, United States Army,
Chief of Staff.

OFFICIAL:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

MEC 3930-256-20/1 ②

Figure 1—Continued.

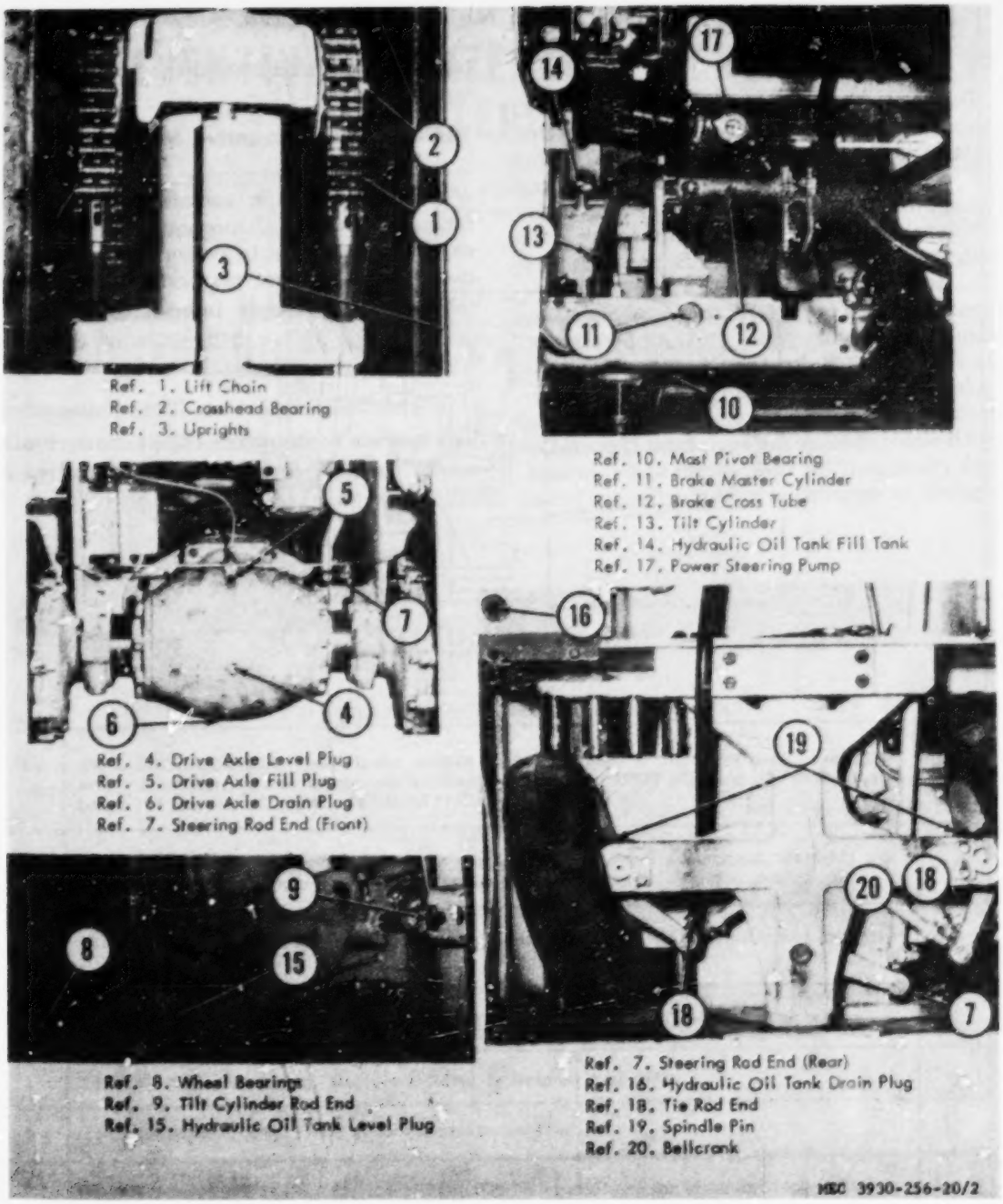

Ref. 1. Lift Chain
Ref. 2. Crosshead Bearing
Ref. 3. Uprights
Ref. 10. Mast Pivot Bearing
Ref. 11. Brake Master Cylinder
Ref. 12. Brake Cross Tube
Ref. 13. Tilt Cylinder
Ref. 14. Hydraulic Oil Tank Fill Tank
Ref. 17. Power Steering Pump
Ref. 4. Drive Axle Level Plug
Ref. 5. Drive Axle Fill Plug
Ref. 6. Drive Axle Drain Plug
Ref. 7. Steering Rod End (Front)
Ref. 8. Wheel Bearings
Ref. 9. Tilt Cylinder Rod End
Ref. 15. Hydraulic Oil Tank Level Plug
Ref. 7. Steering Rod End (Rear)
Ref. 16. Hydraulic Oil Tank Drain Plug
Ref. 18. Tie Rod End
Ref. 19. Spindle Pin
Ref. 20. Bellcrank
MSC 3930-256-20/2

Figure 2. Lubrication points.

Section II. PREVENTIVE MAINTENANCE SERVICES

13. General

To insure that the equipment is ready for operation at all times, it must be inspected systematically, so that defects will be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed in figure 3, and are described in paragraph 14. The item numbers indicate a convenient sequence in which to perform the inspection. Note minor defects discovered during operation of the forklift truck for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, with the corrective action taken, on DA Form 2404 at the earliest possible opportunity.

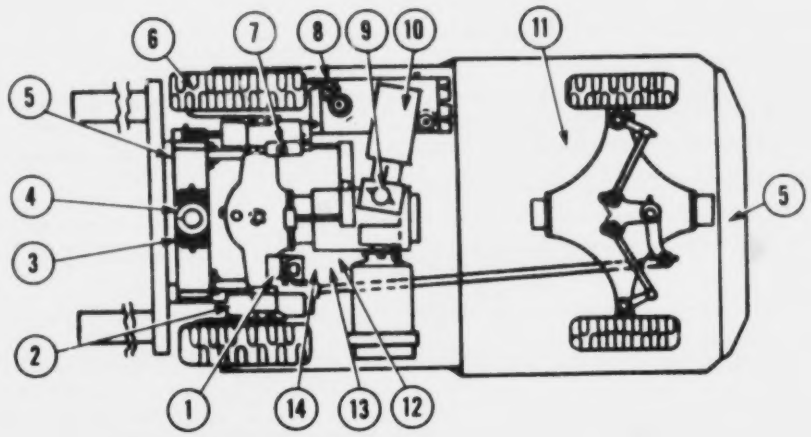
14. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 3 for the quarterly preventive maintenance services.

PREVENTIVE MAINTENANCE SERVICES
QUARTERLY

TM10-3930-256-20 | BAKER MODEL FTD-060-EE, ARMY MODEL MHE 198 | FORK LIFT TRUCK



ITEM	LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER	PAR REF
1	FIRE EXTINGUISHER. Inspect for broken seal. The dry chemical type must be weighed every 6 months. If the weight has decreased to less than 4-1/2 pounds or the pressure is below 125 psi, the extinguisher must be replaced.	
2	TILT CYLINDERS. Check for leaks or damage and for proper adjustment. Uprights will extend evenly when properly adjusted. Tighten loose connections. Tighten packing gland.	
3	LIFT CHAIN. Check for cracked, broken, or excessively worn links. Replace defective links.	
4	LIFT CYLINDER. Check for leaks. Tighten loose connections. Tighten packing nuts.	
5	LIGHTS. Check operation. Replace a defective lamp or lamp unit.	
6	TIRES. Check tires for cuts. Remove foreign material.	
7	BRAKE MASTER CYLINDER. Check master cylinder and lines for leaks and loose connections. Fill to within 1/4 inch of top. Tighten loose connections. Replace leaking master cylinder.	

MEC 3930-256-20/3 (1)

Figure 3. Quarterly preventive maintenance services.

ITEM		PAR REF
8	OIL TANK. Add fluid as required. Clean or replace a dirty or damaged breather cap. Check filter element. Replace if dirty.	
9	POWER STEERING RESERVOIR. Add fluid as required. Clean venthole in filler cap.	
10	STEERING MOTOR BRUSHES. Check for wear.	
11	BATTERY. Remove corrosion. Add fluid as needed.	
12	BRAKE PEDAL. Check pedal for travel. Adjust if necessary. Pressure should increase after 1/4 to 1/2 inch travel.	
13	HORN. Check operation. Replace defective horn.	
14	CONTROLS. Check controls for proper operation. Controls should operate freely without binding.	
	NOTE 1. OPERATIONAL TEST. During operation observe for any unusual noise or vibration. NOTE 2. ADJUSTMENTS. Make all necessary adjustments during operational test.	

NEC 3930-256-20/3 (2)

Figure 3—Continued.

Section III. TROUBLESHOOTING

15. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the forklift truck and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any remedy beyond the scope of organizational maintenance will be reported to direct support maintenance.

16. Troubleshooting Chart

a. Electrical.

(1) *Truck will not start or develop full power.*

Probable Cause	*Remedy*
Dead battery	Charge or replace (para 28).
Fusetron blown	Replace (para 74).
Defective battery plug or receptacle	Replace plug or receptacle (para 20).
Braided shunt in relay broken	Refer to direct support.
Contacts dirty, worn or burned in relay or directional switch.	Replace switch (para 76), or refer to direct support.
Dirt in relay blocking actuation	Clean relay thoroughly.
Mechanical binding in relay or accelerating switch.	Refer to direct support.
Pole faces of plugging magnet not sealing properly.	Refer to direct support.
Snap switches malfunctioning in accelerator master assembly.	Replace switches as necessary (para 73).
Seat switch not working	Adjust or replace switch (para 36*f*(2)).
Open circuit due to loose connections in accelerator master assembly.	Clean and secure connections firmly (para 73).

(2) *All speeds not obtainable.*

Probable Cause	*Remedy*
Open in relay main circuit	Refer to direct support.
Pole faces of plugging magnet not making good contact.	Refer to direct support.
Object lodged in relay	Remove object.
Dirty contacts on relay	Replace contacts (para 72).
Switches in accelerating master assembly malfunctioning.	Replace switches as necessary (para 73).
Sticking or binding of accelerator in any part or stroke.	Refer to direct support.

(3) *Motor overheating.*

Probable Cause	*Remedy*
Dirty relay contacts	Replace contacts (para 72).
Broken, worn or improperly adjusted brushes or brush holders in travel motor.	Refer to direct support.
Vehicle operating in low speed for prolonged periods.	No technical remedy. Advise operator to avoid practice if possible.

(4) *Improper plugging control and timing through all speeds.*

Probable Cause	*Remedy*
Improper timing through all speeds	Refer to direct support.
Truck fails to leave first speed	Refer to direct support.
Shorted wires	Refer to direct support.
Open relay in main circuit	Refer to direct support.
Dirt in relay or directional switch	Clean unit thoroughly.
Dirty contact in relay or directional switch	Clean contacts.

b. Brakes.

(1) *Brakes dragging.*

Probable Cause	Remedy
Plugged master cylinder compensating port	Open wheel cylinder bleeder fitting. If brakes release when fluid escapes, replace master cylinder.
Seat brake improperly adjusted	Adjust so that brake does not drag when seat is down and is firmly applied when seat is up (para 36*f*).
Mineral oil in brake system	Refer to direct support.
Improper service brake adjustment	Adjust brakes (para 37).

(2) *Brake pedal goes to floor.*

Probable Cause	Remedy
Worn lining	Adjust lining clearance (para 37), or install new lined shoes (para 38).
Air in system	Bleed system (para 38).
Improper brake adjustment	Adjust brakeshoes (para 37).
Fluid low in master cylinder	Replenish fluid and check for leaks.
Pedal improperly adjusted	Refer to direct support.

(3) *Brake pedal under pressure gradually goes to floor plate.*

Probable Cause	Remedy
Leaks in hydraulic brake system	Locate and eliminate leaks.
Scored master cylinder barrel or defective cup	Replace master cylinder (para 39).

(4) *Brake pedal has springy or rubbery action.*

Probable Cause	Remedy
Air in system	Bleed system (para 38).
Improper brake adjustment	Adjust brakeshoes (para 37).

(5) *Weak braking action.*

Probable Cause	Remedy
Improperly adjusted brakes	Adjust brakeshoes (para 37).
Oil on linings	Replace brakeshoes (para 38).
Incorrect lining	Replace brakeshoes (para 38).

(6) *Harsh braking action.*

Probable Cause	Remedy
Brake lining grease or oil soaked	Replace brakeshoes (para 38).
Brakeshoes improperly adjusted	Adjust brakeshoes (para 37).
Brake backing plate loose	Refer to direct support.

(7) *Brake releases slowly.*

Probable Cause	Remedy
Hydraulic fluid congealed	Drain, flush and replace with proper brake fluid (para 37).
Retraction of brakeshoes restricted by weak return springs or dirt.	Clean, adjust or replace as necessary (para 38).
Dirt in master cylinder	Replace master cylinder (para 39).

(8) *Truck pulls to one side.*

Probable Cause	Remedy
Improperly set brakeshoes	Adjust brakeshoes (para 37).
Brake lining grease or oil soaked	Replace brakeshoes (para 38).

c. Steering.

(1) *Difficult steering or wandering.*

Probable Cause	Remedy
Steering gear adjustment too slack	Readjust steering gear (para 44).
Damaged drag link	Refer to direct support.
Defective steering gear	Refer to direct support.
Excessive leakage of power steering fluid	Repair leaks, or refer to direct support.

(2) *Fluctuating hydraulic pressure or loss of system pressure.*

Probable Cause	Remedy
Low oil level in steering reservoir	Replenish per LO 10–3930–256–20.

(3) *Power steering inoperative.*

Probable Cause	Remedy
Fusetron blown	Replace (para 74).

d. Hydraulic.

(1) *Lift carriage will not lift load.*

Probable Cause	Remedy
Oil leaks in hoses	Inspect fittings and couplings. Tighten or replace as required (para 65).
Defective pump	Replace pump (para 57).
Fusetron blown	Replace (para 74).
Defective control valve	Replace valve.

(2) *Load creeps down from raised position.*

Probable Cause	Remedy
Oil leak in lines	Tighten fittings (para 65).
Leaky control valve	Tighten connections. Replace valve if necessary (para 58).

(3) *Hoisting speed erratic.*

Probable Cause	Remedy
Air in system	Refer to direct support.
Low level in reservoir	Fill reservoir to prescribed level (LO 10–3930–256–20).

(4) *Control valve plungers will not return to neutral.*

Probable Cause	Remedy
Sticking plungers	Replace control valve (para 58).
Broken springs or dirt lodged in seats	Replace valve (para 58).

(5) *Forks uneven when load is lifted.*

Probable Cause	Remedy
Lift chains out of adjustment	Adjust so chain raises forks evenly (para 63).

(6) *No motion of hydraulic unit when first started up.*

Probable Cause	Remedy
Oil supply in tank too low	Fill per LO 10–3930–256–20.
Oil viscosity too heavy	Change to oil specified in LO 10–3930–256–20.
Air leak in pump inlet line	Tighten hose (para 65).
Restricted pump inlet line	Repair or replace (para 65).
Broken pump drive shaft, motor shaft or coupling.	Replace pump (para 57) or motor (para 70).
Pump completely worn out	Replace pump (para 57).
Weak or broken relief valve spring	Replace control valve (para 58).
Relief valve plunger stuck by dirt or foreign matter.	Replace control valve (para 58).
Pump rotating in wrong direction	Check motor internal connections.
Insufficient pressure to start load	Refer to direct support.
Machine overloaded	Reduce load.
Failure at switch	Replace switch (para 77).

(7) *Loss of motion during operation.*

Probable cause	Remedy
Loss of oil supply due to broken pump inlet, outlet, or cylinder connecting lines or tank return line.	Replace line (para 65).

(8) *Slow motion.*

Probable Cause	Remedy
Pump wearing out	Replace pump (para 57).
Pump rpm too slow	Check pump motor (para 70), battery.
Failure in hydraulic lines	Replace lines (para 65).
Relief valve plunger held partially off its seat by dirt or foreign matter.	Replace control valve (para 58).
Badly scored relief valve plunger or seat	Replace control valve (para 58).
Weak relief valve spring	Replace control valve (para 58).

Probable Cause	Remedy
Aerated oil supply (foam in tank)	Change oil (LO 10-3930-256-20).
Oil too thin	See LO 10-3930-256-20 for proper grade.
Oil supply too low	Fill reservoir (LO 10-3930-256-20).
Worn or scored piston packing	Refer to direct support.
Bore of cylinder tube badly scored or nicked	Refer to direct support.
Cylinder misalignment	Correct chain adjustment (para 63).
Mechanical obstruction of moving parts	Remove obstruction.

(9) *Jerky motion.*

Probable Cause	Remedy
Air in system	Refer to direct support.
Cylinder misaligned due to structural warpage	Refer to direct support.

(10) *Speed or operation slows down after usage.*

Probable Cause	Remedy
Pump worn	Replace pump (para 57).
Improper oil used in system	See LO 10-3930-256-20 for proper grade.
Dirt or foreign matter in system	Drain, flush out system, replace with new oil.

(11) *Noisy operation.*

Probable Cause	Remedy
Air in hydraulic system	Refer to direct support.
Insufficient oil supply	Fill reservoir (LO 10-3930-256-20).
Pump worn out	Replace pump (para 57).
Air leak in pump intake line	Tighten hose (para 65).
Misalignment between motor shaft and pump drive shaft.	Tighten attaching parts.
Vibration of pump lines	Secure lines.
Chattering relief valve. Weak relief valve spring.	Replace control valve (para 58).
Incorrectly set relief valve pressure	Replace control valve (para 58).
Broken or cracked gears in pump	Replace pump (para 57).

(12) *Oil heats up rapidly.*

Probable Cause	Remedy
Pump slippage, oil too thin	See LO 10-3930-256-20.
Continued operation at relief valve pressure setting.	Check operation (TM 10-3930-256-10).
Operating pressure is close to relief valve pressure setting.	Check operation (TM 10-3930-256-10).
Operating at excessively high pressure	Refer to direct support.
Dirty oil	Change oil (LO 10-3930-256-20).
Misalignment between pump drive shaft and motor shaft.	Tighten attaching parts.

(13) *Hoist cylinder packing leaks.*

Probable Cause	Remedy
Defective hoist cylinder	Refer to direct support.

(14) *Hoist or tilt cylinder lowers or tilts while truck stands idle.*

Probable Cause	Remedy
Worn packing	Refer to direct support.
Worn or scored seals, packing or cylinders	Refer to direct support.
Failure in hydraulic line	Check, tighten or replace line (para 65).

(15) *Reservoir flows over.*

Probable Cause	Remedy
Excess oil in reservoir	Check oil level, with forks lowered, and mast tilted back.

Section IV. ELECTRICAL SYSTEM

17. General

This section presents instructions for organizational maintenance of the electrical system. Figure 4 shows the location of components.

18. Hourmeter

a. Removal.

(1) Remove screws attaching instrument housing (fig. 4) to truck, and take housing from support to extent permitted by attached wiring.

(2) Remove nut (fig. 4) at bottom of instrument housing, and lift hourmeter out of housing.

(3) Disconnect leads at hourmeter, tape ends, and tag leads for identification.

b. Installation. Reverse procedures in *a* above.

19. Light Switch

a. Removal.

(1) Remove screws attaching instrument housing (fig. 4) to truck, and remove housing.

(2) Remove nut at top of light switch (fig. 4) and take switch out through opening in instrument housing.

(3) Disconnect, tape and tag leads from switch.

b. Installation. Reverse procedures in *a* above.

20. Battery Connector Receptacle

a. Removal. Remove screws shown in figure 5. and disconnect leads from receptacle.

b. Installation. Reverse procedures in *a* above.

21. Stoplight Switch

Before replacing switch, check that it is truly defective, and not merely in need of adjustment, and that leads are correctly installed.

a. Inspection and Test.

(1) Remove floor plate (para. 54).

(2) Inspect that wires are labeled "+" and "33" to switch (fig. 6) are connected to terminals marked "A" and that wires labeled "9" and "10" are connected to "B" terminals. If not, connect them correctly before proceeding.

(3) Connect a voltmeter lead to each "A" terminal, and operate switch button by hand. If meter reads system voltage with button free, and zero voltage with button pressed, switch is operative. Test at "B" terminals for opposite results. Continue to (4) below.

(4) With voltmeter still connected as in (3) above, operate pedal manually. If operation of pedal does not give same results, switch position must be adjusted so brake application closes switch at "A" terminals and opens switch at "B" terminals, reversing this on releasing brake pedal.

b. Adjustment. Disconnect leads, and loosen two nuts shown in figure 6. Adjust switch position by turning switch in or out so switch lights stoplight before braking action begins, and light goes out before pedal reaches top of travel. Tighten nuts.

c. Removal.

(1) Remove floor plates (para. 54).

(2) Remove outermost nut (fig. 6) and take switch from bracket.

(3) Disconnect wires from switch "A" terminals.

d. Installation. Reverse procedures in *c* above and adjust switch (*b* above).

22. Headlight

a. Removal.

(1) Remove clamps (fig. 7) holding conduit to outer upright.

(2) Disconnect wires at terminals at bottom end of conduit.

(3) Remove screws, nuts, and washers attaching light to upright and remove light and conduit as an assembly.

b. Repair. Repair of headlight is confined to replacing the sealed beam lamp (para. 24*a*).

c. Installation. Reverse procedures in *a* above.

23. Stop and Taillight

a. Removal

(1) Remove screws, nuts, and washers (fig. 8) attaching guard to truck. Lift

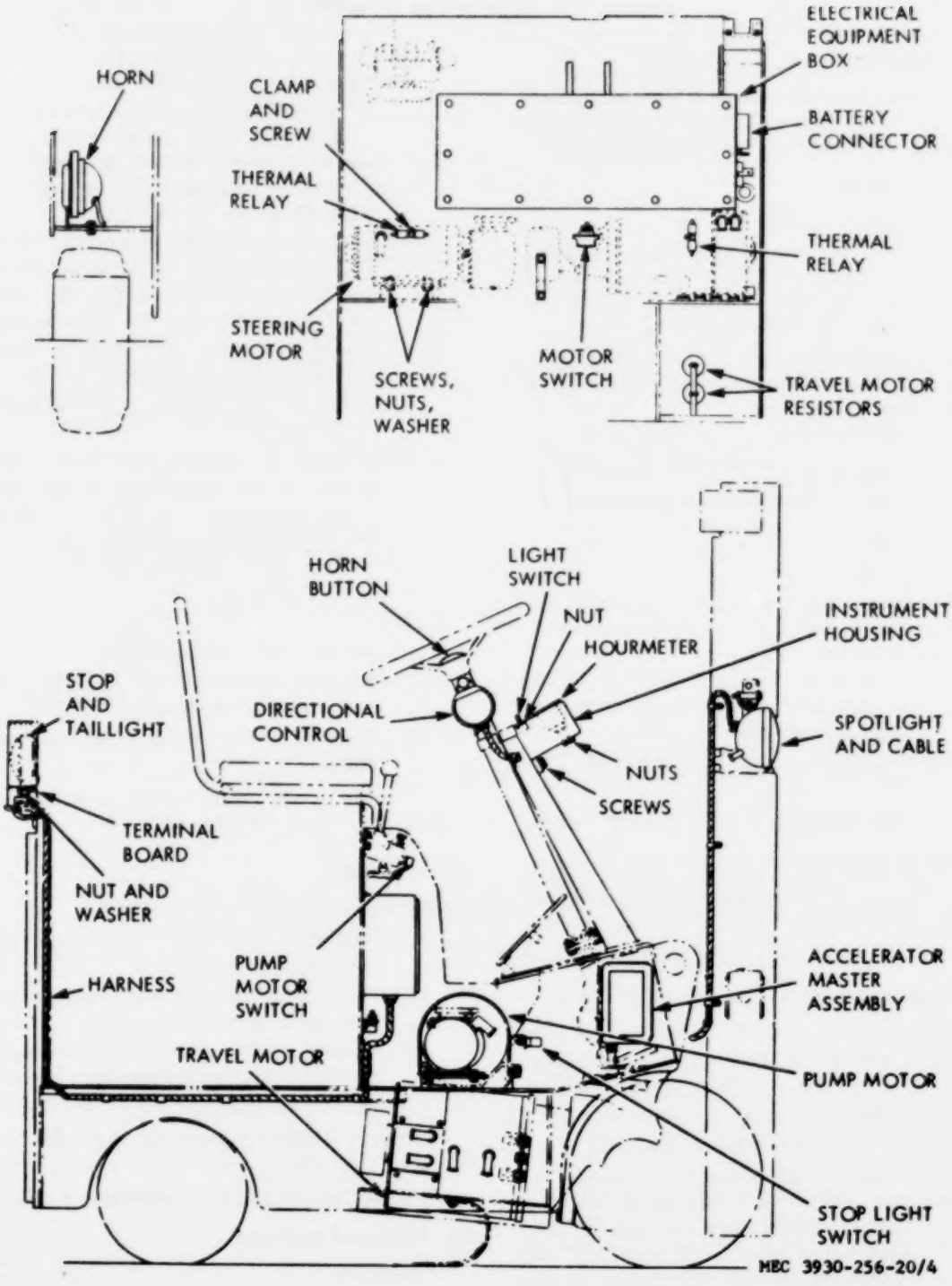


Figure 4. Electrical system arrangement.

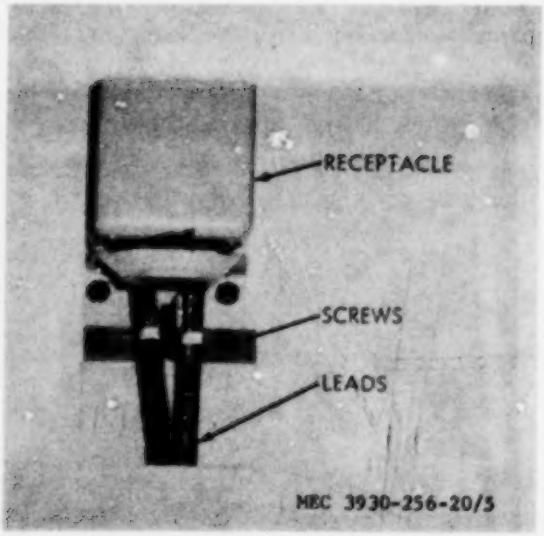


Figure 5. Battery connector receptacle.

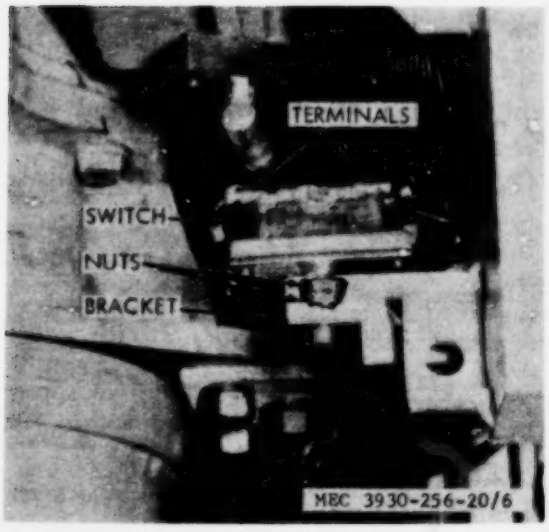


Figure 6. Stoplight switch, installed.

guard and disconnect light wires from terminal board under guard.

(2) Remove screws holding screen to guard, and remove screen.

(3) Remove nut and washer holding light assembly to guard, and remove guard.

b. Repair. Remove bezel and lens, and install new bulb. Replace bezel and lens.

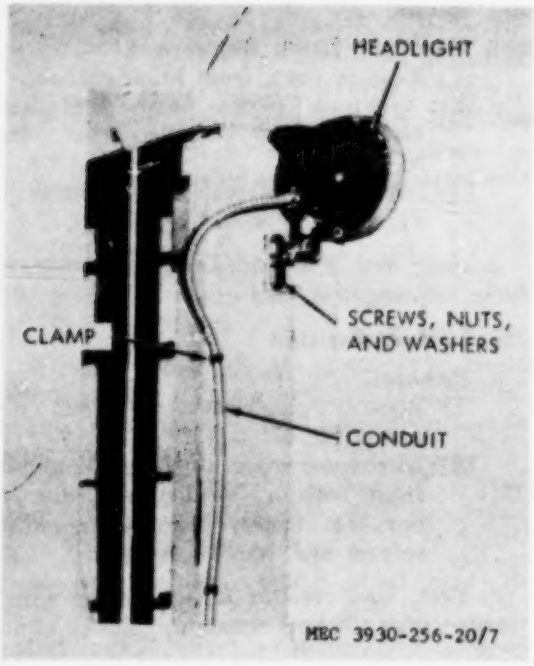


Figure 7. Headlight, installed.

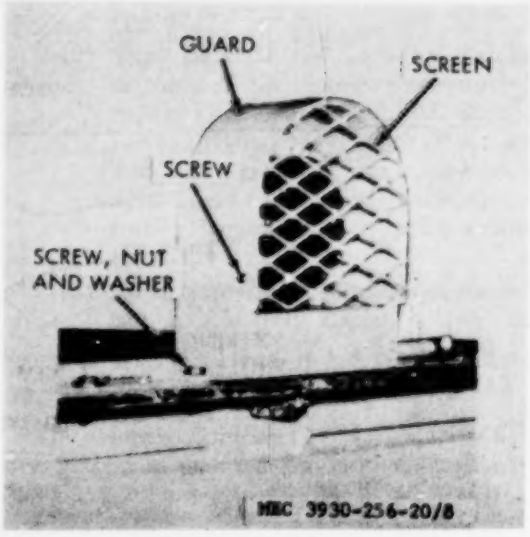


Figure 8. Stop and taillight, installed.

c. Installation. Reverse procedures in *a* above.

24. Lamps

a. Headlight Lamp Replacement.

(1) Remove bezel from headlight.

(2) Withdraw sealed beam unit from headlight shell and disconnect wires to lamp.

(3) Install by reversing procedures in (1) and (2) above.

b. Stop and Taillight Lamp Replacement. Refer to paragraph 23.

25. Taillight Resistor

a. Removal.

(1) Remove electrical equipment box cover (fig. 4).

(2) Disconnect wires numbered 32 and 33 from resistor, located at center of box, on board. Remove mounting screws and remove resistor.

b. Test. Test resistor with ohmeter across terminals for 40 ohms resistance, plus or minus 20%.

c. Installation. Reverse procedures in *a* above.

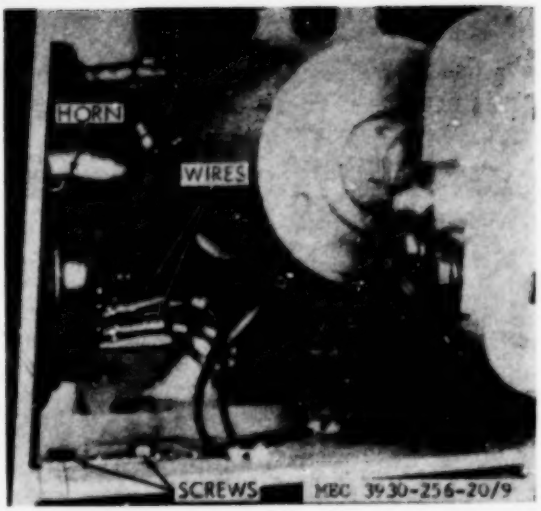


Figure 9. Horn, installed.

26. Horn

a. Removal

(1) Disconnect wires (fig. 9) from horn.

(2) Remove screws holding horn to truck frame and remove horn.

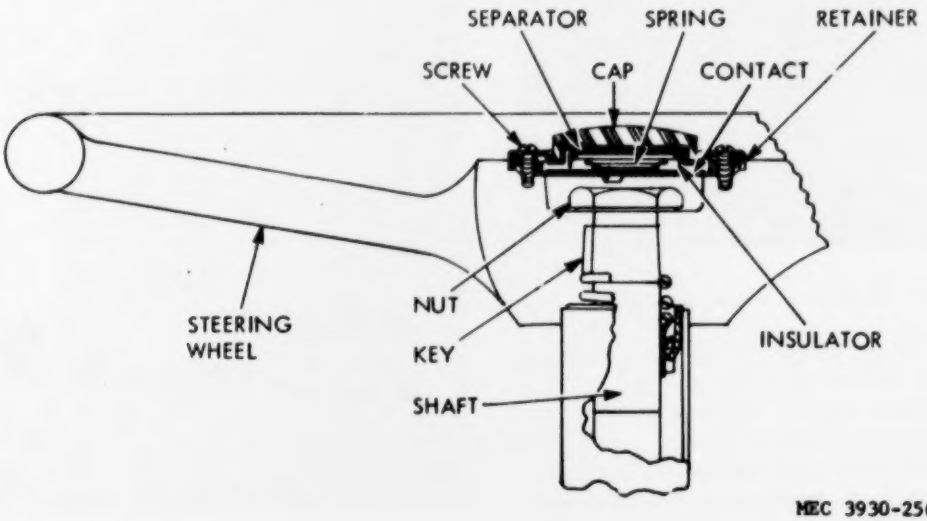


Figure 10. Horn button, cutaway view.

b. Installation. Reverse procedures in *a* above.

27. Horn Button

a. Removal. Remove screws (fig. 10) and lift off retainer, cap, separator, insulator, contact, and spring.

b. Installation. Reverse procedures in *a* above.

28. Battery

a. Service. Refer to TM 10–3930–256–10 and TM 10–1690A for materials handling equipment.

b. Removal.

(1) Open battery compartment, and disconnect battery leads from truck at receptacle (TM 10–3930–256–10).

(2) With a hoist rated at more than 3,000-pound capacity, lift battery from truck by hooks through the lifting eyes at each side of battery.

Caution: **Use spreader bar as wide as battery between lifting hooks to avoid inward pull on battery case. Keep personnel at a distance during removal operation to minimize risk from electrolyte spillage.**

c. Installation. Reverse procedures in *b* above.

29. Headlight, Stop and Taillight Wiring Harness Repair

Wiring to these lights is contained in flexible metal conduit. It is not practical to repair this wiring. If damaged, refer to direct support for replacement.

Section V. POWER AXLE

30. Power Axle Service

All service allocated to organizational maintenance of the power axle is given in LO 10–3930–256–20.

Section VI. REAR AXLE

31. General

Since the rear axle provides steering for the truck, it is functionally associated with the steering gear. Maintenance at organizational level is limited to adjustment of the tie rods for wheel alignment. Related steering system adjustments will be found in paragraph 44.

32. Adjustment of Wheel Alignment

a. Measurement. Determine if wheel alignment adjustment is needed as follows:

(1) With rear axle (fig. 11) level front to rear, and wheels in straight ahead position, measure inside span between tires at hub height at front of axle.

(2) Repeat procedure in (1) above at rear of axle.

(3) If measurements obtained in (1) and (2) above differ by over 1/16 inch, adjust as given in *b* below until wheels are parallel to within 1/16 inch as measured in (1) and (2) above.

b. Adjustment.

(1) Loosen (but do not remove) screws and nuts through all tie rod end clamps (fig. 11).

(2) Turn each tie rod an equal number of turns in the direction necessary to change alignment as required. Each tie rod has right-hand threads at one end, left-hand threads at the other end, so adjustment can be made to change effective length without dismounting tie rod.

(3) When adjustment has been completed, tighten tie rod clamp screws and washers.

33. Steering Knuckle Service

All steering knuckle service allocated to organizational maintenance is given in LO 10–3930–256–20.

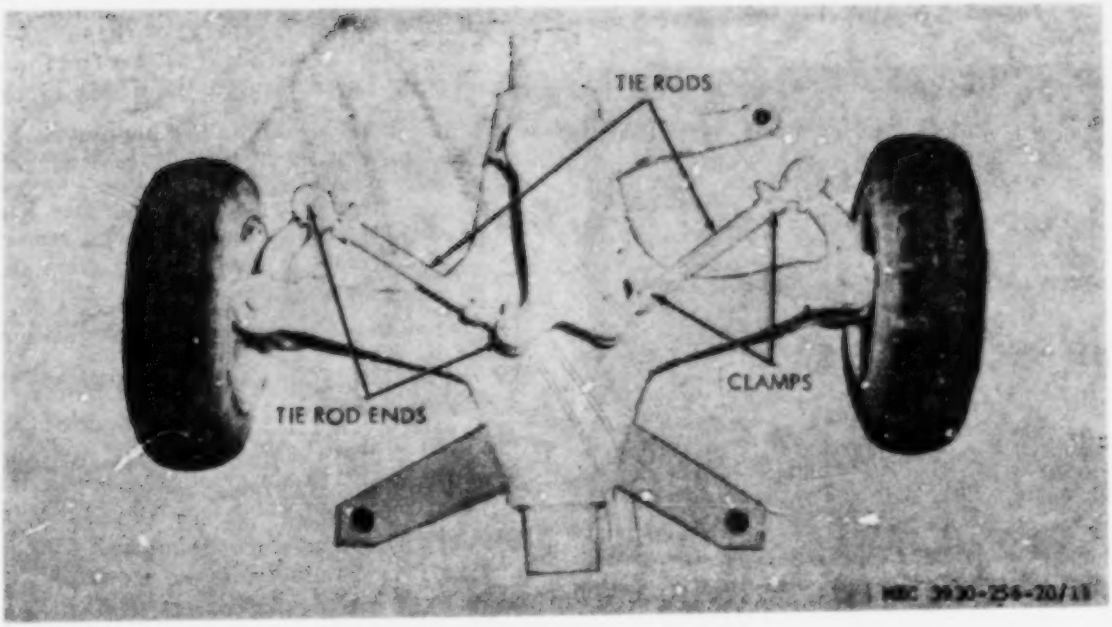


Figure 11. Steering axle adjustment.

Section VII. BRAKES

34. General

This section contains organizational maintenance instructions for the mechanical (parking) and hydraulic (service) brake systems used on the truck.

35. Handbrake Lever

a. Removal.

(1) Release hand brake, and remove screws, nuts, and washers which attach handbrake lever (fig. 12) to bracket on steering column.

(2) Remove cotter pin and clevis pin attaching handbrake cable assembly to handbrake lever, and remove lever.

b. Installation. Reverse procedures in *a* above.

36. Handbrake Cable and Seat Brake Rod

a. Cable Removal.

(1) Remove handbrake lever (para 35*a*).

(2) Loosen nuts (fig. 12) holding cable to slotted brackets, at each end of cable housing, and slide cable from slots.

(3) Remove screw, nut, washer, and clamp holding cable assembly to truck frame.

(4) Remove truck floor plate (para 54). Remove pin and cotter pin attaching cable to brake lever bar, and remove cable assembly from truck.

b. Cable Installation. Reverse procedures in *a* above.

c. Cable Housing Adjustment. Position cable housing by adjusting nuts at both slotted brackets until brake releases fully and locks in applied position with a definite snap action.

d. Brake Rod Removal.

(1) Remove truck floor plate (para 54). Remove cotter pin and washer from brake lever bar mounting pin (fig. 12).

(2) Apply handbrake, and depress seat to get slack in linkage. Take lever bar off mounting pin and out of yoke. Release seat.

(3) Hold yoke jamnut and turn yoke off brake rod. Remove jamnut and striker.

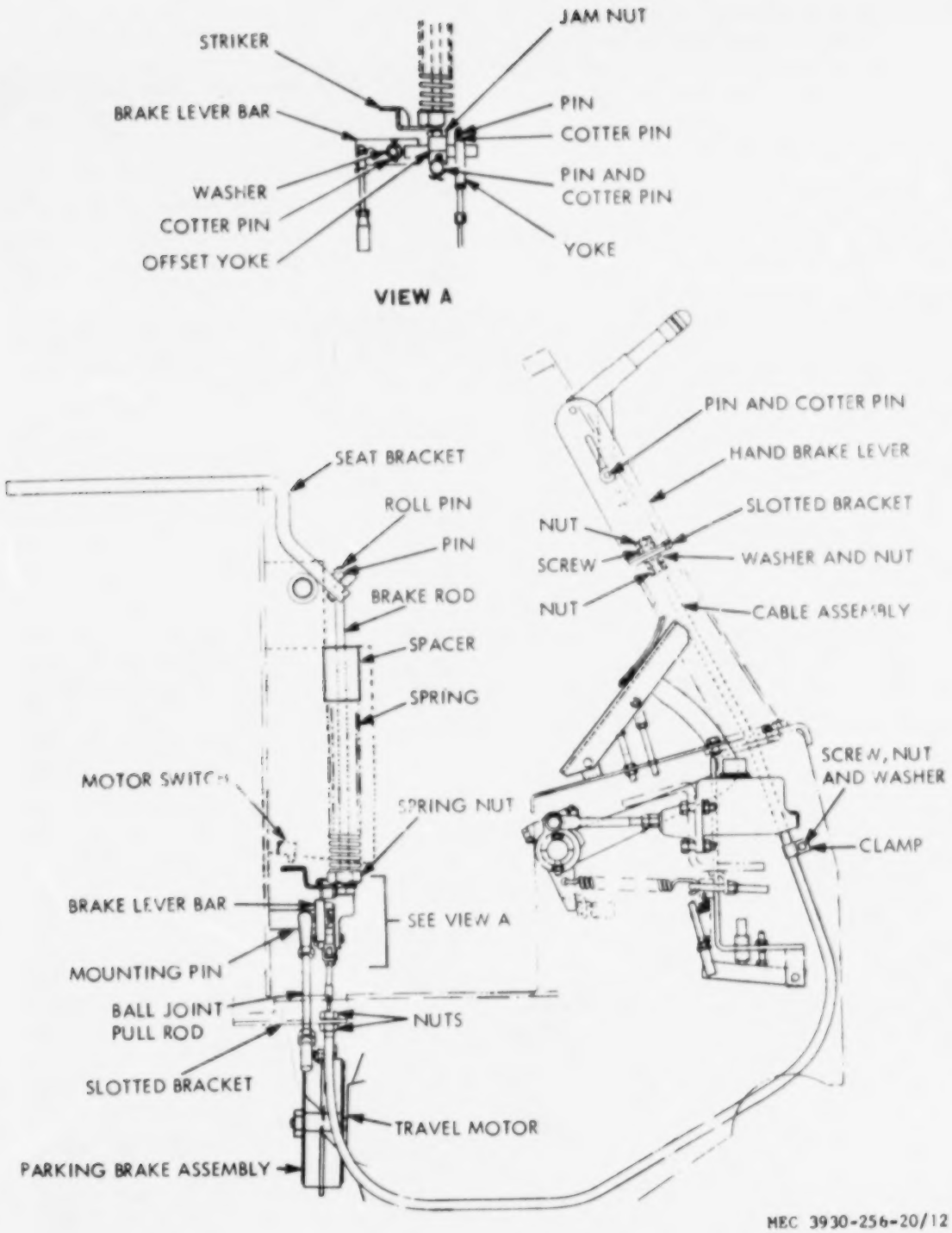


Figure 12. Parking brake controls.

(4) Take spring nut, spring, and spacer tube out from bottom of electrical equipment box. Lift rod out top of box.

e. Brake Rod Installation. Install spacer, spring, striker, and nuts as shown in figure 12, on rod, and reverse procedures in *d* above.

37. Service Brakes

a. Brake Adjustment. Adjust the brakeshoes by adjusting the cam bolts.

(1) Jack up front wheels as follows:

(*a*) Tilt mast to extreme back position and raise carriage about 3 feet above floor. Block carriage up for safety while working.

(*b*) Place wooden block directly under each bottom corner of uprights.

(*c*) Tilt mast forward until wheels are just clear of floor.

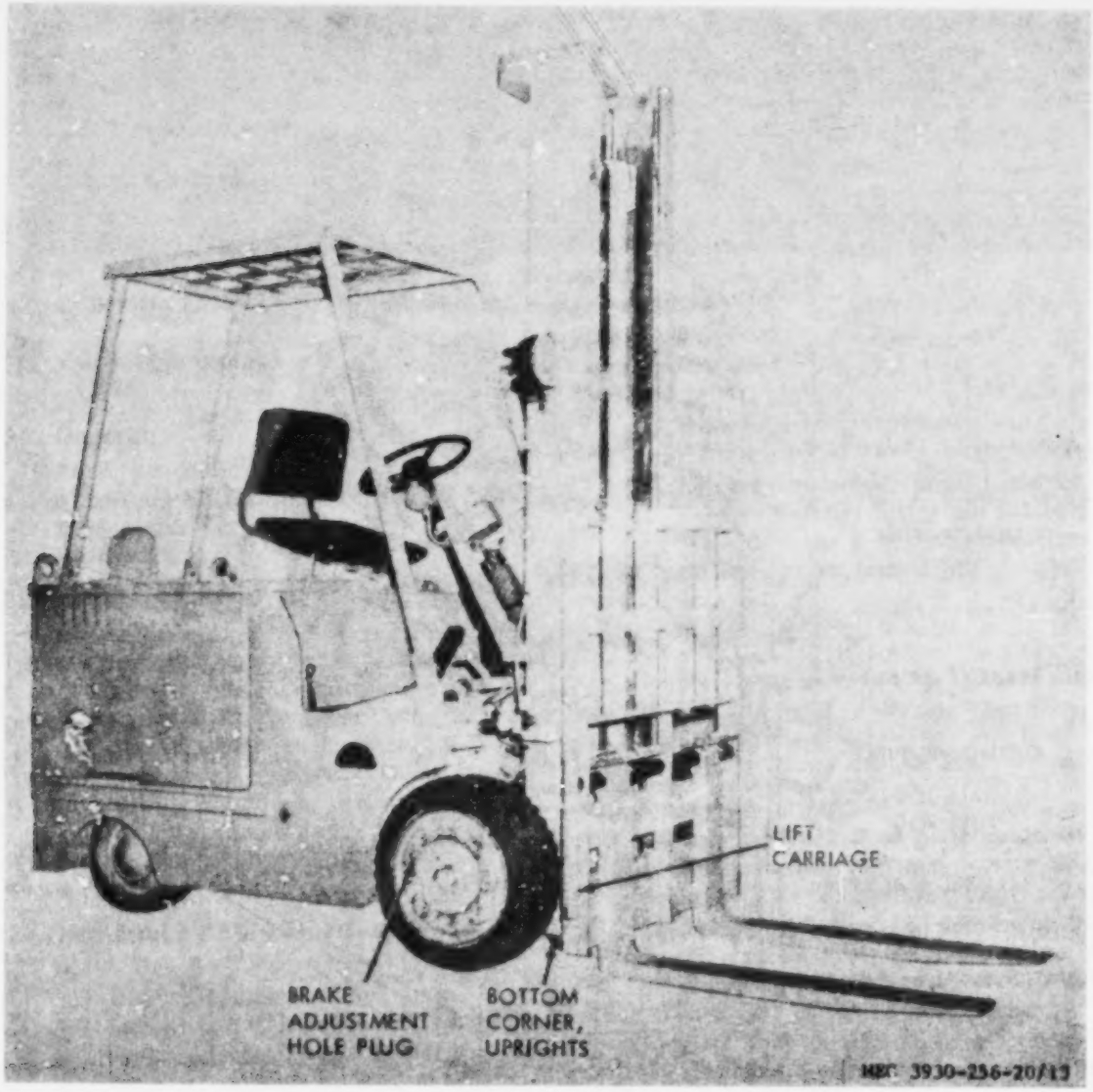


Figure 13. Service brake adjustment.

Figure 14. Brake bleeder screws.

Caution: **Check stability of raised truck before beginning work.**

(2) Remove brake adjustment hole plug (fig. 13) from each front wheel. Turn wheel as necessary to align hole with cam bolt. Adjust with a $\frac{5}{8}$-inch deep socket.

Note. Use only a deep socket, to avoid dropping socket of wrench inside wheel.

(3) Each wheel brake has two cam bolts, one at front and one at rear of backing plate. Turn front cam bolts toward front of truck to bring front lining in contact with brakedrum until wheel drags slightly when turned by hand.

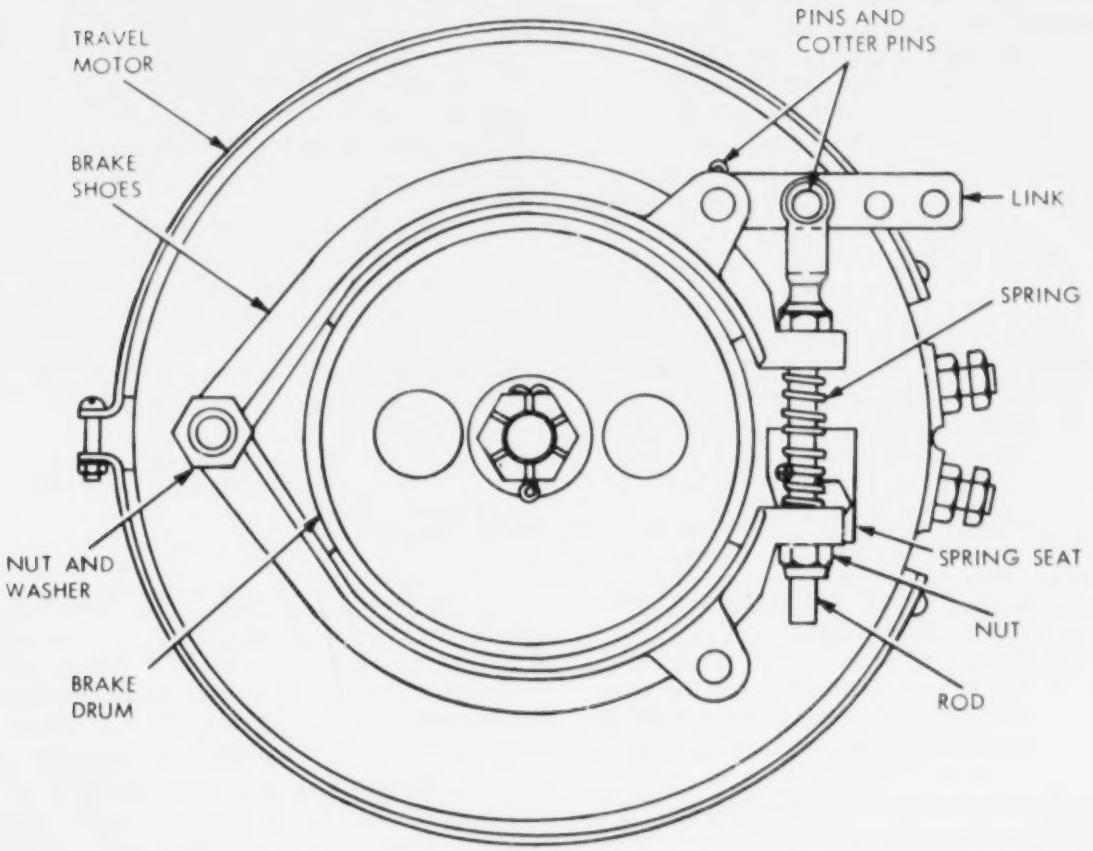


Figure 15. Parking brakeshoe removal.

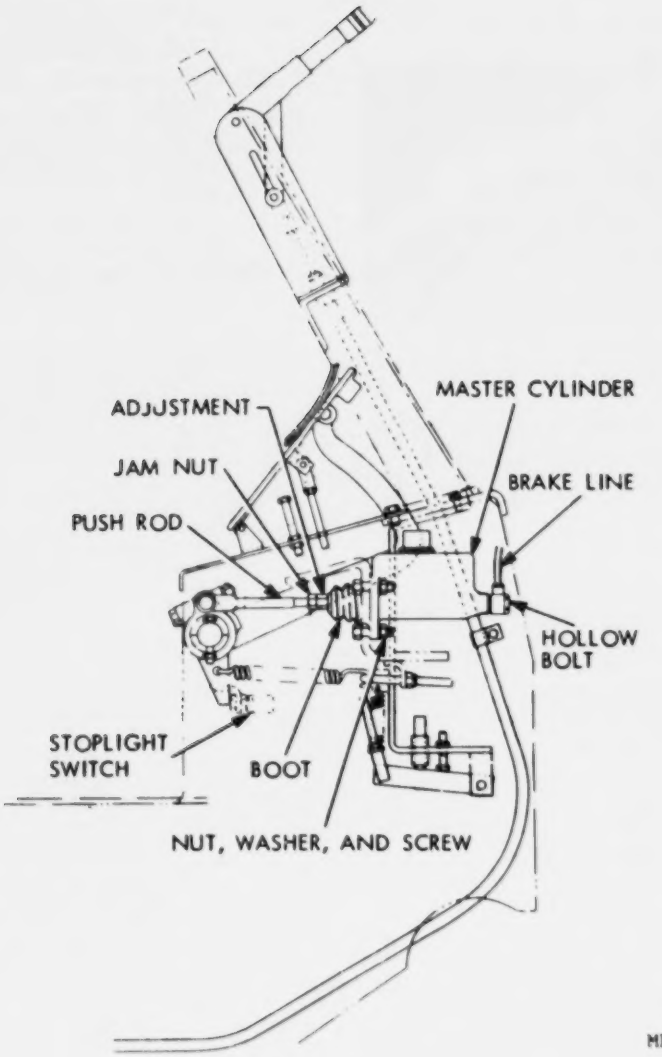


Figure 16. Master cylinder removal.

Back off adjusting cam only enough to allow free rotation.

(4) Repeat procedure at rear shoe adjusting cam bolt, turning bolt toward rear of truck for contact. Make both adjustments at each wheel as uniform as possible.

b. Bleeding Service Brake System. The hydraulic brake system must be bled to expel air in the system. The need is generally indicated by springy or spongy brake pedal action. Two men are required to bleed the system, one to maintain a constant supply of fluid in the master cylinder and to pump the brake pedals, the other to perform the bleeding operation.

(1) Remove filler plug from master cylinder and fill with hydraulic brake fluid.

(2) Clean bleeder screws at each wheel

cylinder (fig. 14). Attach one end of bleeder hose to bleeder screw and place other end of hose in clean container partially filled with hydraulic brake fluid. Be sure end of hose is submerged in the hydraulic fluid.

(3) Turn bleeder screw counterclockwise three-quarters of a turn. Apply a steady pressure to the brake pedal. Hydraulic fluid containing air bubbles should be forced through the bleeder hose into container.

(4) Maintain the fluid level in master cylinder and continue to operate brake pedal until the fluid flows in a steady solid stream without air bubbles. Close bleeder screw by turning in clockwise direction. Remove bleeder hose.

(5) Repeat bleeding procedure at the other wheel, replenishing brake fluid supply in master cylinder before each wheel cylinder is bled. Replace filler plug in master cylinder.

Caution: **Hydraulic brake fluid bled from the brake system must not be reused.**

38. Parking Brakeshoes

a. Removal.

(1) Remove floor plate (para 54) and raise truck to make underside of brake accessible.

(2) Remove nut at bottom of threaded rod (fig. 15), and cotter pins and pins which secure link to brakeshoe, and to rod. Remove rod from installed position through brakeshoes.

Note. Do not disassemble linkage items further than necessary to remove brakeshoes.

(3) Remove nut and washer which hold both brakeshoes to travel motor, and remove brakeshoes.

b. Inspection.

(1) Examine lining thickness. If less than 1/16 inch of lining remains, replace brakeshoes.

(2) At this time examine brakedrum for tightness on travel motor shaft, and for scoring of friction surface. If unsatisfactory condition is noted, refer to higher maintenance level correction.

c. Installation and Adjustment.

(1) Reverse procedures in *a* above.

(2) Adjust position of nut on threaded rod to give 0.010- to 0.020-inch clearance between drum and each brake lining.

Note. Use one gage for each brakeshoe, taking both readings at the same time.

39. Master Cylinder

a. Removal.

(1) Remove floor plate (para 54).

(2) Remove hollow bolt (fig. 16) and take brake line fitting from front of master cylinder (brake line need not be removed). Take precautions to keep dirt from entering brake line.

(3) Remove nuts, washers, and screws attaching master cylinder to truck, and remove master cylinder. Push rod will remain in place on brake cross-shaft.

b. Installation.

(1) Reverse procedures in *a* above.

(2) Fill cylinder with brake fluid (LO 10–3930–256–20).

(3) Bleed brake hydraulic system (para 37*b*), and adjust wheel brakes (para 37*a*).

(4) Loosen jamnut on push rod, and adjust length of push rod to give 1/4-inch to 5/8-inch free travel of pedal before brake application begins. Tighten jamnut to secure adjustment.

Section VIII. WHEELS

40. General

This section contains instructions for replacement of the truck wheels, and service and replacement of the rear wheel bearings. Refer service other than this to higher maintenance level.

41. Wheels

a. Front Wheel Removal.

(1) Jack up front of truck (para 37*a*(1)).

(2) Remove hex head bolts holding wheel to truck.

(3) Remove wheel.

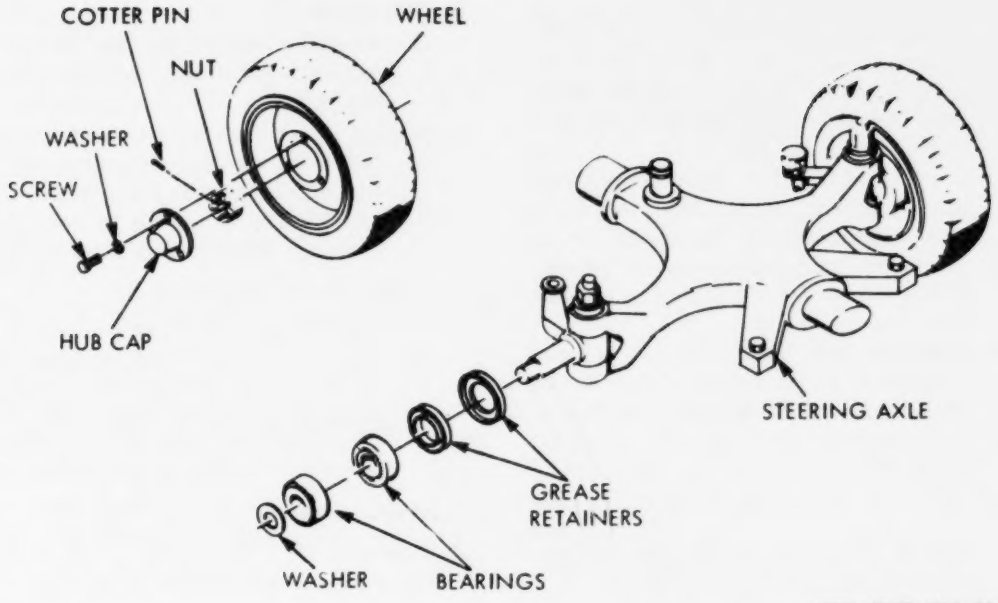


Figure 17. Rear wheel removal, exploded view.

b. Front Wheel Installation. Reverse procedures in *a* above.

c. Rear Wheel Removal.

(1) Lower forks fully and tilt mast back. Raise rear of truck until wheels clear floor.

(2) Remove hubcap (fig. 17), and remove cotter pin, nut, and washer from bore of wheel.

(3) Draw wheel from steering axle spindle. Because of manufacturing tolerances the cone and rollers of the inboard bearing may remain with the spindle. If so, it can easily be removed. Avoid damaging oil seal, if possible, when removing wheel.

d. Rear Wheel Installation. Reverse procedures in *c* above, tightening wheel nut snug, then backing it off not more than ⅙ turn, and install cotter pin.

42. Rear Wheel Bearings

a. Removal.

(1) Remove rear wheels (para 41*c*).

(2) Pull bearings from bore of wheel. Use slip hammer bearing puller to pull bearings from wheel if they stick in bore.

(3) Remove retaining rings which position bearings in wheel bore.

b. Service.

(1) Clean bearings with SD and dry thoroughly.

(2) Inspect cups and rollers for wear or failure. Inspect cone and roller assemblies for roughness when rotated.

(3) If bearings are serviceable, repack with grease GAA, using a bearing packing device if available.

c. Installation. Reverse procedures in a above.

Section IX. STEERING

43. General

This section contains organizational maintenance instructions for the steering gear and linkage to the steering axle. Service according to the instructions in LO 10–3930–256–20.

44. Steering Gear Assembly

a. Lash Adjustment.

(1) Remove nut (fig. 18) holding drag link to pitman arm, and disconnect drag link.

Note. If necessary, use puller, or gently hammer drag link free, but do not damage threads.

(2) Loosen jamnut and turn lash adjuster with screwdriver until steering wheel passes through center of travel with 14 to 18 ounces pull on the rim. Tighten jamnut, and install drag link.

b. Steering Linkage Adjustment.

(1) With steering wheel halfway between extreme right and extreme left turn, assemble pitman arm to steering gear as shown in figure 18.

(2) With trailing axle wheels in straight ahead position, adjust drag link to proper length by loosening clamps and turning drag link tubing. Make certain pitman arm is at correct angle.

(3) Tighten clamps.

45. Steering Wheel

a. Removal.

(1) Remove horn button assembly (para 27*a*).

(2) Remove nut (fig. 10).

(3) With a steering wheel puller, draw wheel from shaft.

Caution: **Do not try to remove wheel without proper puller, as the steering gear could be damaged.**

b. Installation. Reverse procedures in *a* above.

46. Power Steering Pump

a. Removal.

(1) Disconnect hoses from pump (para 47).

(2) Remove screws and washers (fig. 19)

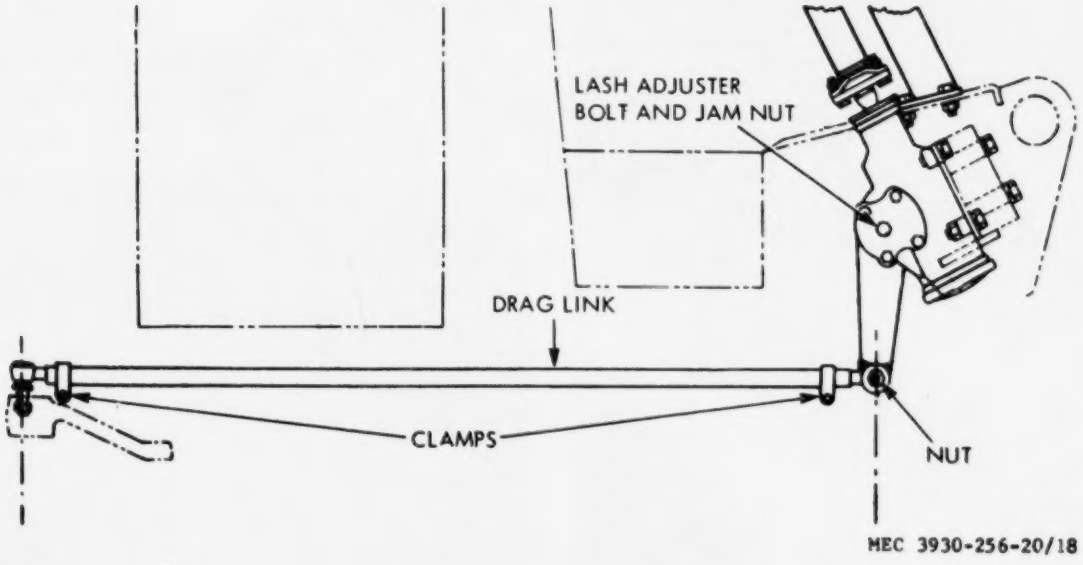


Figure 18. Steering adjustment.

attaching pump to motor. Remove pump.

b. Installation. Reverse procedures in *a* above.

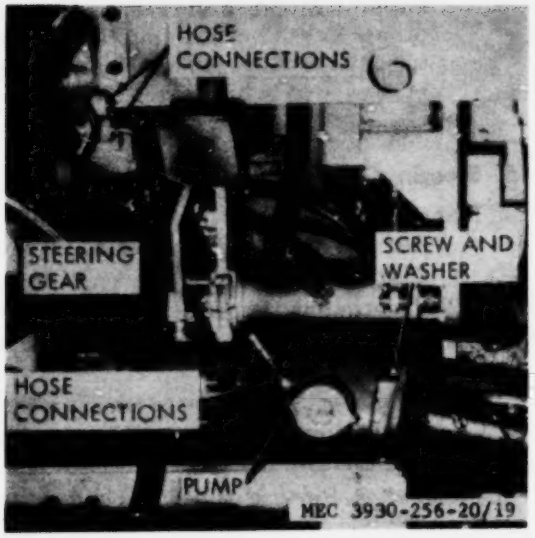


Figure 19. Steering hoses removal.

47. Hoses

Two hoses connect the power steering pump and steering gear. Each hose is a unit assembly which is not to be taken apart.

a. Removal.

Note. Before removal, arrange a container to catch draining oil.

(1) Remove floor plate (para 54).

(2) Disconnect hoses at connections at steering gear (fig. 19).

(3) Disconnect hoses at power steering pump and plug all openings to exclude dirt.

b. Installation. Reverse procedures in *a* above. Refill reservoir per LO 10-3930-256-20.

48. Power Steering Reservoir.

a. Removal. Remove power steering hoses

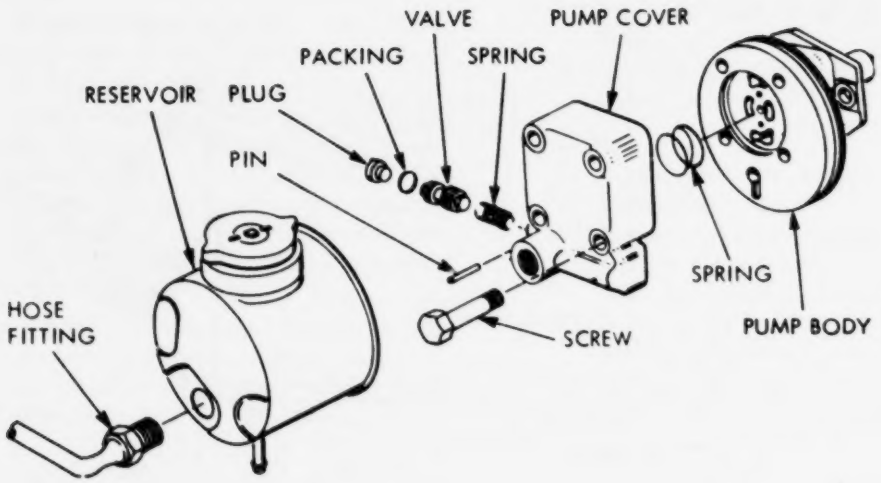


Figure 20. Power steering pump, partially exploded view.

from pump (para 47) and draw reservoir straight off from pump.

b. Installation. Reverse procedures in *a* above.

c. Service. Service according to LO 10–3930–256–20.

49. Relief Valve

a. Removal.

(1) Remove floor plate (para 54). Place pan under pump to catch draining oil, and disconnect hoses at pump (para 47*a*).

(2) Remove pressure hose fitting (fig. 20), and draw reservoir from pump. Remove screws and take pump body from cover.

(3) Remove plug, drive out pin and remove valve, packing, and spring from pump cover.

b. Installation. Reverse procedures in *a* above, and refill reservoir per LO 10–3930–256–20.

Section X. BODY AND HOOD

50. General

This section contains maintenance instructions for exterior structural components, and the seat of the truck, within the scope of organizational maintenance.

51. Battery Box Top Cover

a. Removal.

(1) Remove taillight and guard as an assembly (para 23*a*(1)).

(2) Remove screws and nuts (fig. 21) which attach cover hinge to truck, and lift off cover.

b. Installation. Reverse procedures in *a* above.

52. Battery Box Side Covers

a. Removal. Pull open side cover to be removed, remove nuts and screws (fig. 21) attaching side cover to truck, and remove cover.

b. Installation. Reverse procedures in *a* above.

53. Overhead Guard

a. Removal. Loosen nuts (fig. 21) on clamps at each upright of guard, and lift guard from truck.

b. Installation. Reverse procedures in *a* above.

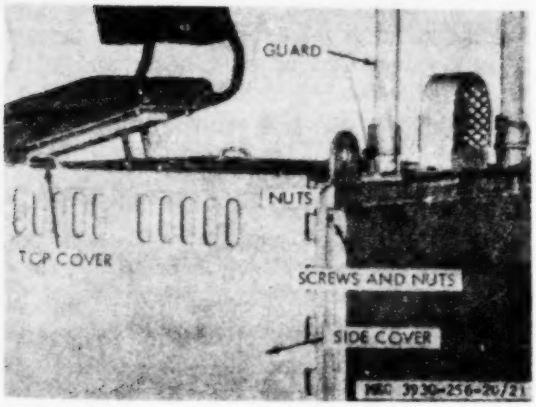


Figure 21. Battery box top cover and overhead guard.

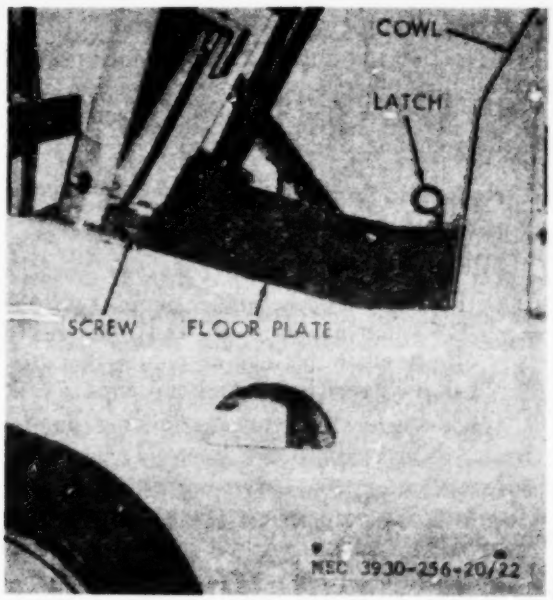


Figure 22. Floor plate removal.

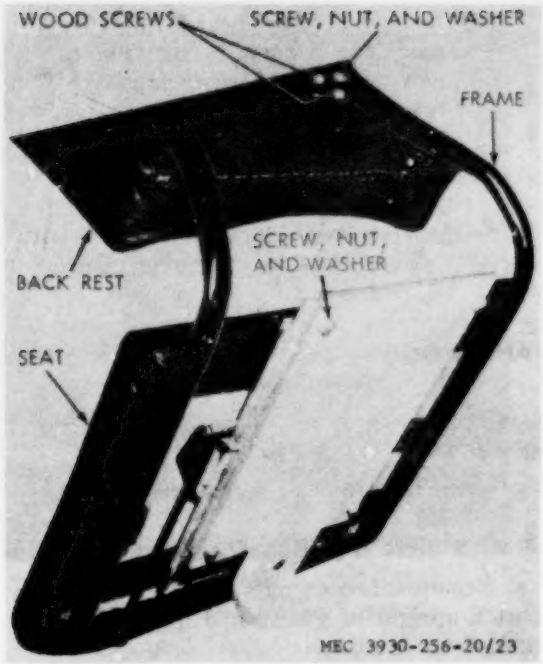


Figure 23. Seat.

54. Floor Plate

a. Removal.

(1) Unhook cowl latches (fig. 22), and lift cowl free of truck.

(2) Remove screws at front of floor plate, and lift off floor plate.

b. Installation. Reverse procedures in *a* above.

55. Seat Assembly

a. Removal. Remove screws, nuts, and washers (fig. 23) which attach assembly to brake actuating bar. Remove seat from truck.

b. Disassembly. Remove wood screws holding backrest to frame and remove backrest. Remove nuts and washers holding seat cushion to frame. Do not disassemble guide rails.

c. Repair. Repair slightly damaged (torn) upholstery material according to good commercial practice, by sewing, or adhesive patch. If wear or damage is extensive, replace entire cushion.

d. Assembly. Reverse procedures in *b* above.

e. Installation. Reverse procedures in *a* above.

Section XI. HYDRAULIC LIFT COMPONENTS

56. General

This section contains instructions for organizational maintenance of the hydraulic and mechanical items related to the lift mechanism, including controls.

57. Hydraulic Pump Assembly

a. Removal.

(1) Remove floor plate (para 54).

(2) Position a bucket under pump (fig. 24) to catch draining oil, and disconnect hose elbow fittings at pump. Remove hoses from pump and cap ends.

(3) Remove two screws attaching pump to motor. Remove pump.

b. Installation. Reverse procedures in *a* above.

58. Control Valve

a. Removal.

(1) Remove cowl (para 54*a*(1)).

(2) Remove one cotter pin and clevis pin (fig. 25) from links at each lever, disconnecting levers from valve plungers.

(3) Disconnect hoses equipped with elbow fittings, remove hose clamp, and remove last hose.

(4) Remove nuts, screws, and washers attaching valve to truck, and remove valve. Cap or plug hoses and parts of valve.

b. Installation. Reverse procedures in *a* above.

59. Control Valve Levers

a. Removal.

(1) Perform procedures in paragraph 58*a*, (1) and (2).

(2) Remove cotter pins from pin on which handles pivot (fig. 25), withdraw pin, removing spacer washers as pin is drawn out of levers and bracket.

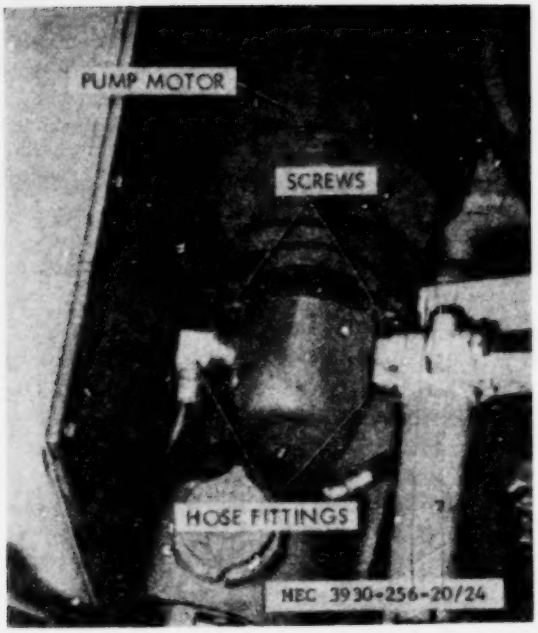


Figure 24. Hydraulic pump and motor.

(3) Lift off levers.

b. Installation. Reverse procedures in *a* above.

60. Control Valve Bracket

a. Removal.

(1) Remove levers (para 59*a*).

(2) Disconnect leads at switch (fig. 25), loosen nut and turn switch out of bracket.

(3) Remove nuts, screws, and washers holding bracket to truck and remove bracket.

b. Installation. Reverse procedures in *a* above, turning switch in to point that levers actuate it when operated.

61. Tilt Cylinders

a. Removal

(1) Disconnect hoses (fig. 26) from tilt cylinder. Cap hoses and plug ports in cylinder to exclude dirt.

(2) Remove screws, nuts, and washers attaching plates to brackets on truck frame and on uprights. Remove plates from notches in pins.

(3) Pull or drive pins from brackets and tilt cylinder ends. Be careful not to let cylinder fall as pins come out.

b. Installation. Reverse procedures in *a* above. After installation, operate tilt control several times to purge air from cylinders. Check cylinders and hose fittings for leakage while operating.

62. Crosshead Rollers

a. Removal.

(1) Lower carriage fully, remove nuts (fig. 27) from chain adjusting screws, and lay chains back out of way.

(2) Remove retaining rings, washers, rollers, and bushing from crosshead.

b. Installation.

(1) Reverse procedures in *a* above.

(2) Adjust nuts on chain adjusting screws so each chain begins lifting at same time.

Caution: **If load is not shared equally by chains, load will cock crosshead and cause rapid wear and damage to lift cylinder.**

63. Chain Assemblies

a. Adjustment. Refer to paragraph 62*b*(2).

b. Removal.

(1) Refer to paragraph 62*a*(1).

(2) Unhook chains from carriage, assembly.

c. Installation. Reverse procedures in *b* above.

d. Repair. Repair is limited to replacing damaged links.

(1) Remove chain from truck (*b* above).

(2) With a chain breaking tool, remove damaged link or links from chain. Failure of one link may damage adjacent links. Remove all damaged links.

(3) Install replacement link and rivet pin end to secure side plates of chain.

Note. Plates of end links are secured by cotter pins. Do not rivet or peen these pins.

64. Forks

a. Removal.

(1) Lower carriage fully, and lift load backrest from carriage (fig. 28).

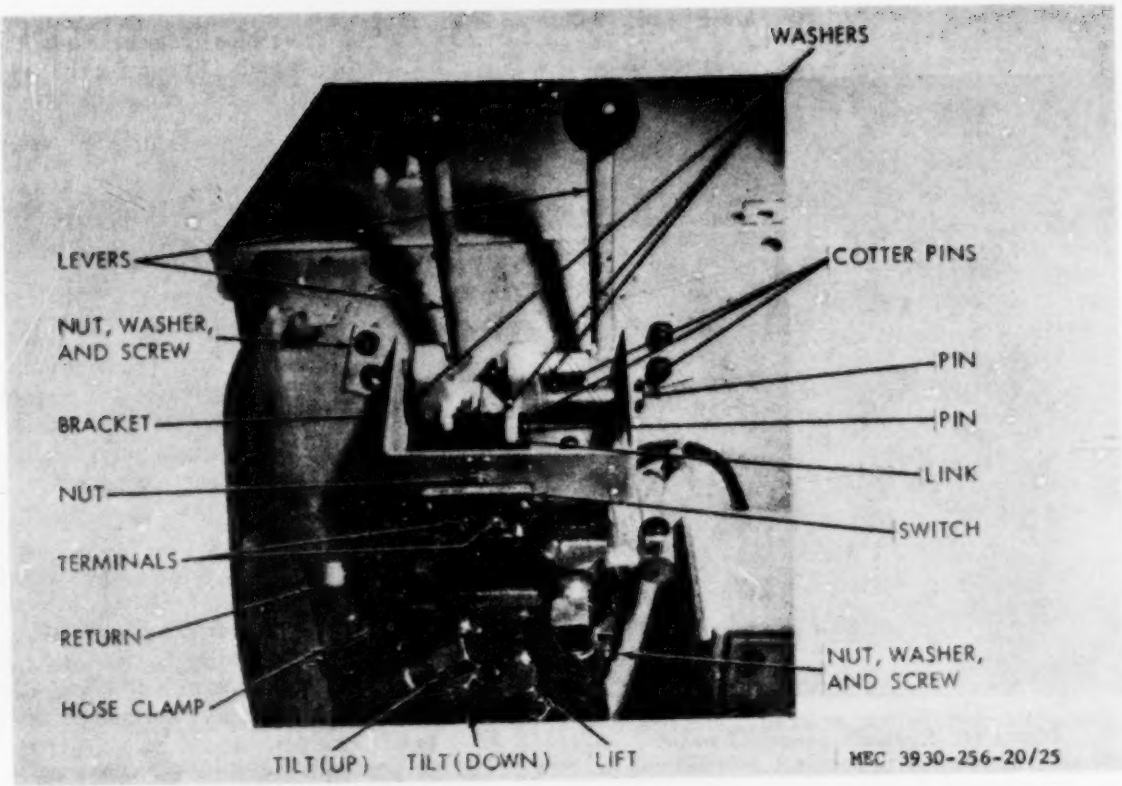


Figure 25. Control valve.

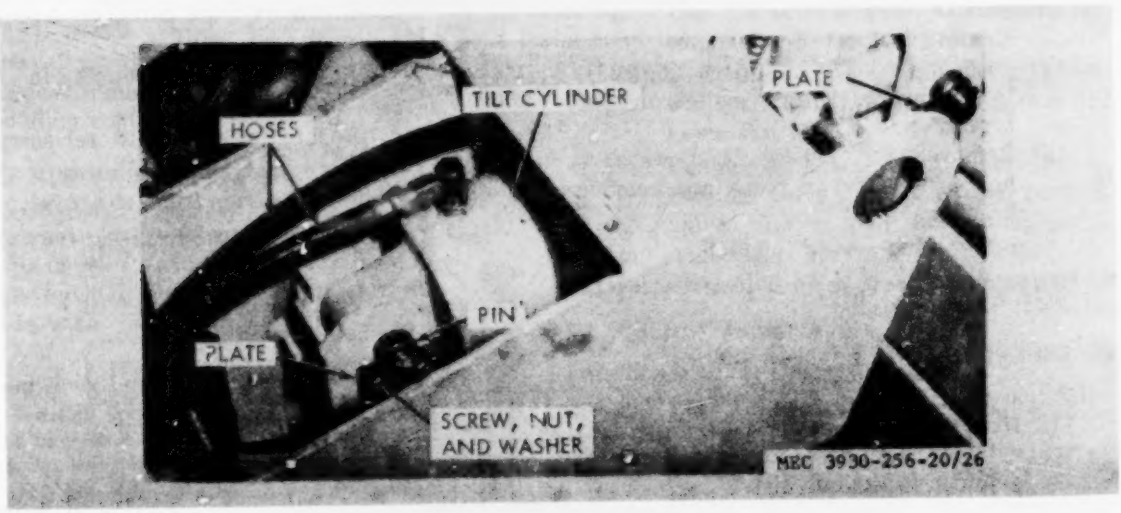


Figure 26. Tilt cylinder removal.

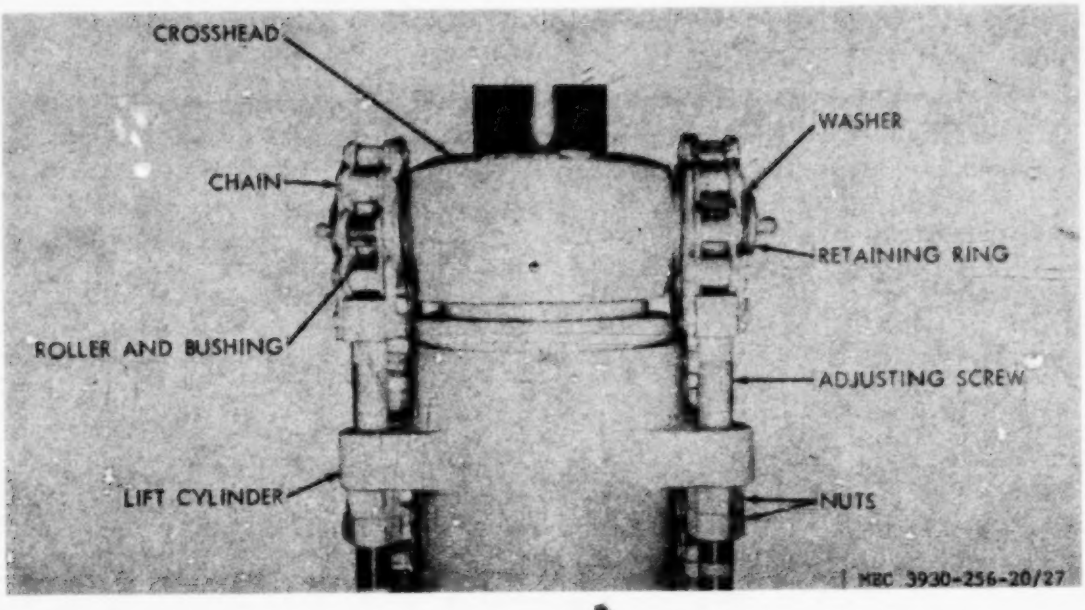


Figure 27. Crosshead, rollers, and chains.

(2) Lift spacers from carriage. Remove screws, washers, and one plate from carriage. Hold forks and draw shaft from carriage. Forks are now free. Remove them.

b. Installation. Reverse procedures in *a* above.

65. Tilt and Lift Cylinder Hoses

a. Removal.

Note. Cap or plug open hoses and ports to exclude dirt.

(1) Remove floor plate (para 54).

(2) Disconnect hoses to be removed at control valve (fig. 25).

(3) Disconnect tilt cylinder hoses from valve, at tees in line to tilt cylinders. If these hoses are to be removed, take them off truck at this point.

(4) Disconnect hoses at tilt cylinders. Remove nuts and washers holding tee fittings in tilt cylinder lines to bracket (fig. 29) and remove hoses from truck.

(5) Disconnect lift cylinder hose at flow restrictor (fig. 29) and remove hose.

b. Installation. Reverse procedures in *a* above. Actuate lift and tilt systems for several cycles without load to bleed units of air.

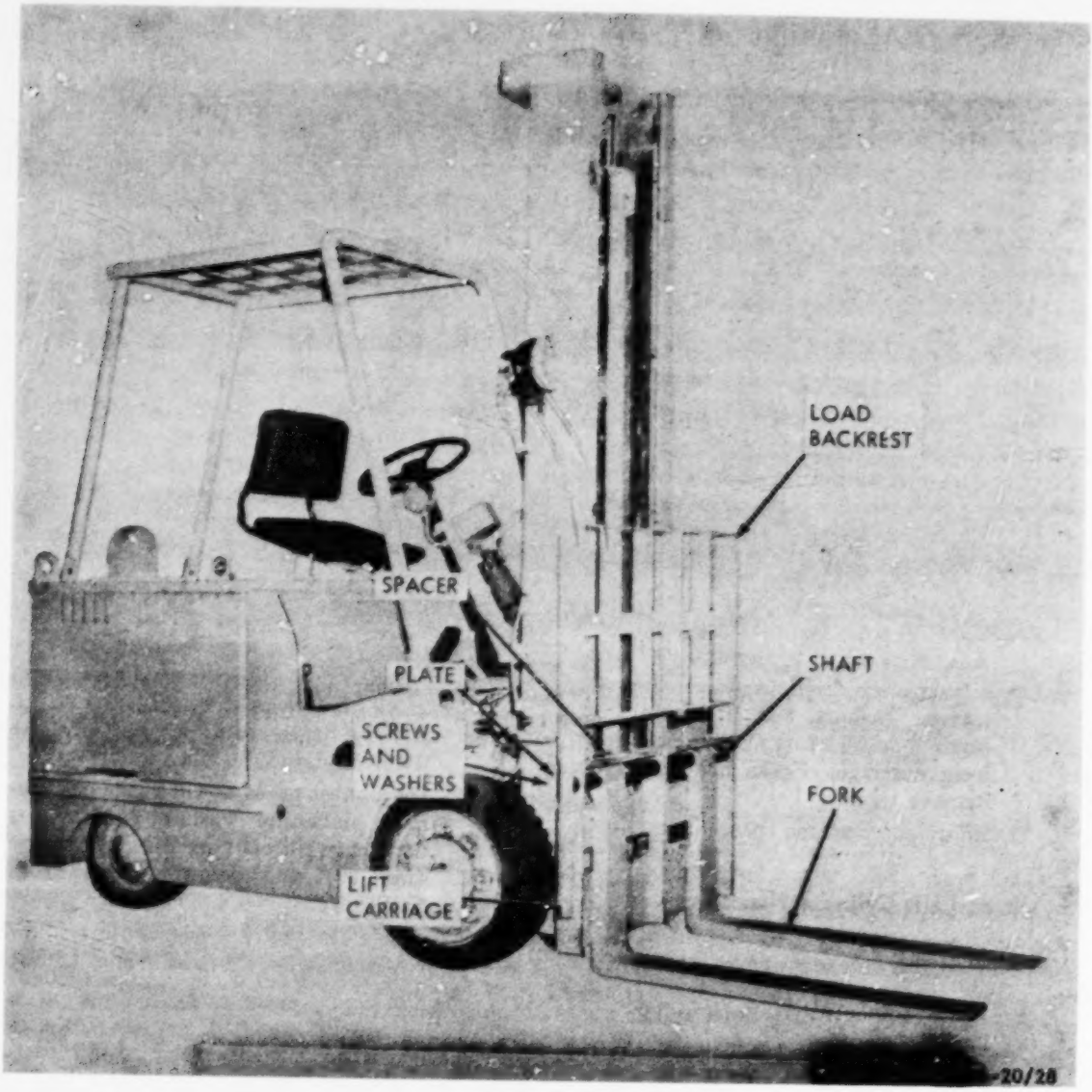


Figure 28. Fork removal.

66. Filter Cartridges

Two filters are used in the hydraulic system; one in the suction line to the pump, within the tank, the other in the return line from the control valve, at left rear of tank.

a. Suction Filter Cartridge Replacement.

(1) Remove cowl and floor plate (para 54).

(2) Remove screws and washers (fig. 30) and lift off cover and gasket. Leave suction hose connected to cover.

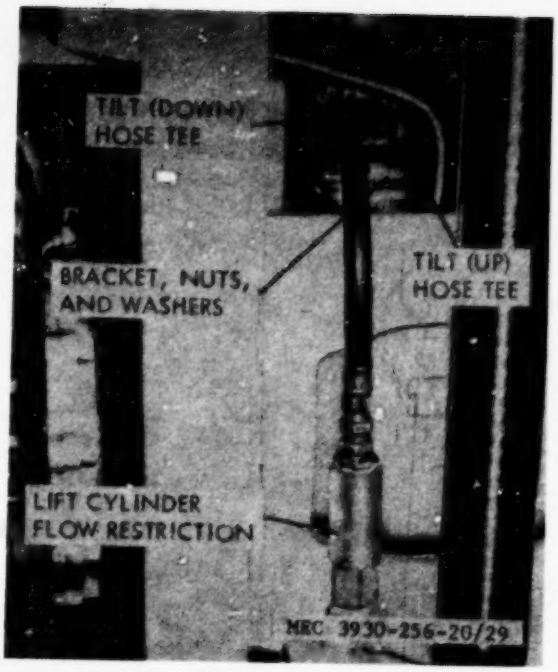


Figure 29. Hose removal.

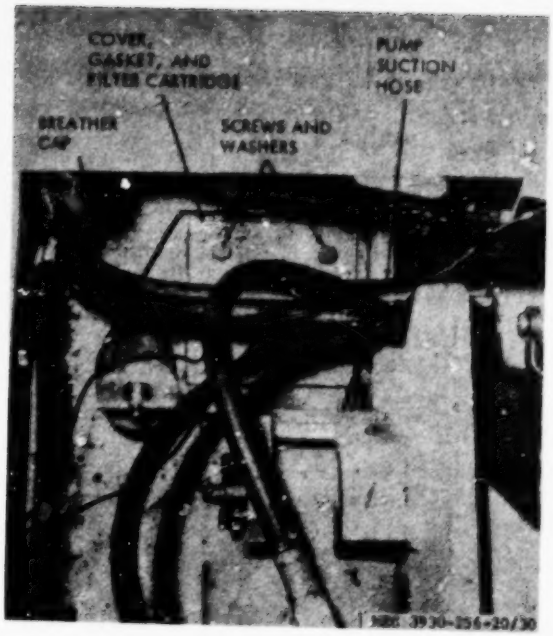


Figure 30. Section filter replacement.

(3) Lift out used cartridge and install new cartridge.

(4) Reverse procedure in (1) above.

b. Return Filter Cartridge Replacement.

(1) Turn cartridge (fig. 31) from filter cover by hand.

(2) Install new cartridge by reversing procedure in (1) above.

67. Oil Tank

Service according to LO 10–3930–256–20.

68. Oil Breather Cap

To clean, remove cap (fig. 30), by lifting it off, clean thoroughly with SD, and replace.

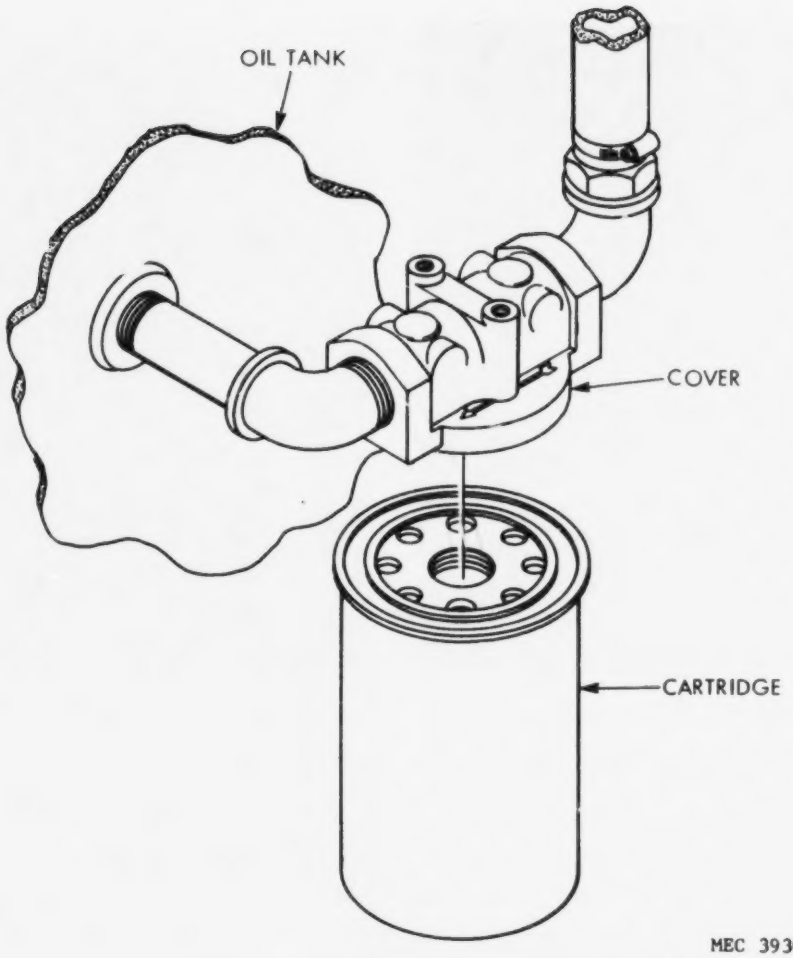


Figure 31. Return filter cartridge replacement.

Section XII. ELECTRIC MOTORS

69. General

This section contains instructions for the pump motor, the power steering motor, and such other electrical items as are within the scope of organizational maintenance.

70. Pump Motor

a. Removal.

(1) Remove floor plate (para 54).

(2) Remove pump (para 57).

Note. Leave hoses connected to pump.

(3) Disconnect wires at terminals (fig. 32), remove nuts and screws through strap holding motor. Remove screw and clamp (fig. 4) holding thermal relay to motor and remove thermal relay. Remove motor.

b. Test.

(1) With motor removed from truck (or while pump is removed from motor), make connections to motor, as shown in figure 33.

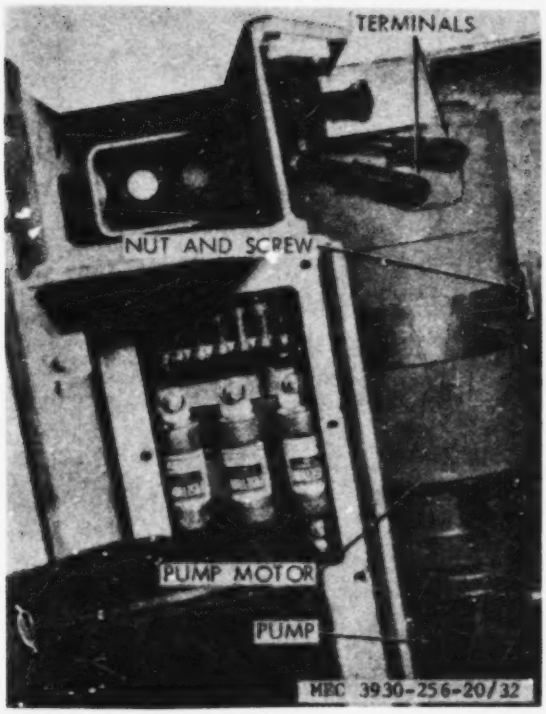


Figure 32. Pump motor removal.

Caution: **Hold motor securely against starting torque action.**

(2) Note free running current draw of motor. Draw should not exceed 120 amperes at 36 volts. Motor should run freely and quietly.

c. Installation. Reverse procedures in *a* above.

71. Steering Motor

a. Removal.

(1) Remove pump from motor (para. 46*a*(2)). Do not remove hoses from pump, but set pump aside so hoses are not stressed.

(2) Remove screw and clamp (fig. 4) securing thermal relay to motor. Lift off relay.

(3) Disconnect leads to motor terminals, remove mounting screws, nuts, and washers at motor base flange, and remove motor.

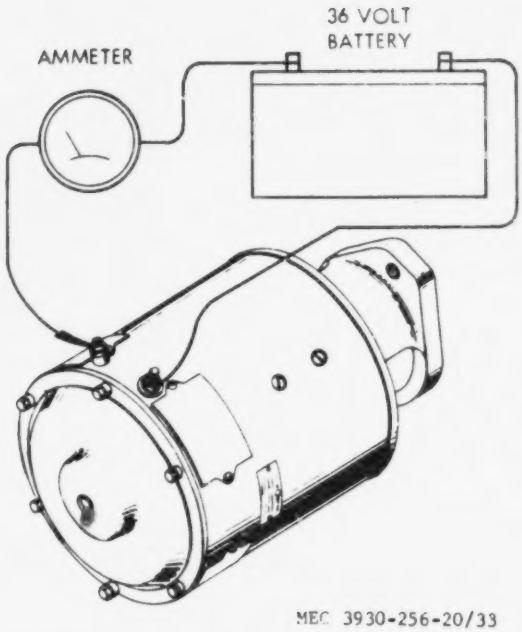


Figure 33. Motor test, organizational maintenance.

b. Test. Refer to paragraph 70*b* for procedure. Free running current draw for this motor is 18 amperes at 36 volts.

c. Installation. Reverse procedures in *a* above.

72. Master or Auxiliary Control Relay Repair

Organizational maintenance of these relays is limited to replacing worn contacts of the main pump, accelerating, and directional relays. Figure 34 shows the location of these relays in the electrical equipment box, with wiring identification. Since remaining relays should be removed for service, refer them to direct support for maintenance.

a. Contact Inspection.

(1) Remove truck cowl (para 54*a* (1)), screws securing electrical equipment box cover, and cover.

(2) Visually inspect mating surfaces of contacts (fig. 35). Use a small angle head mirror and light, to see back

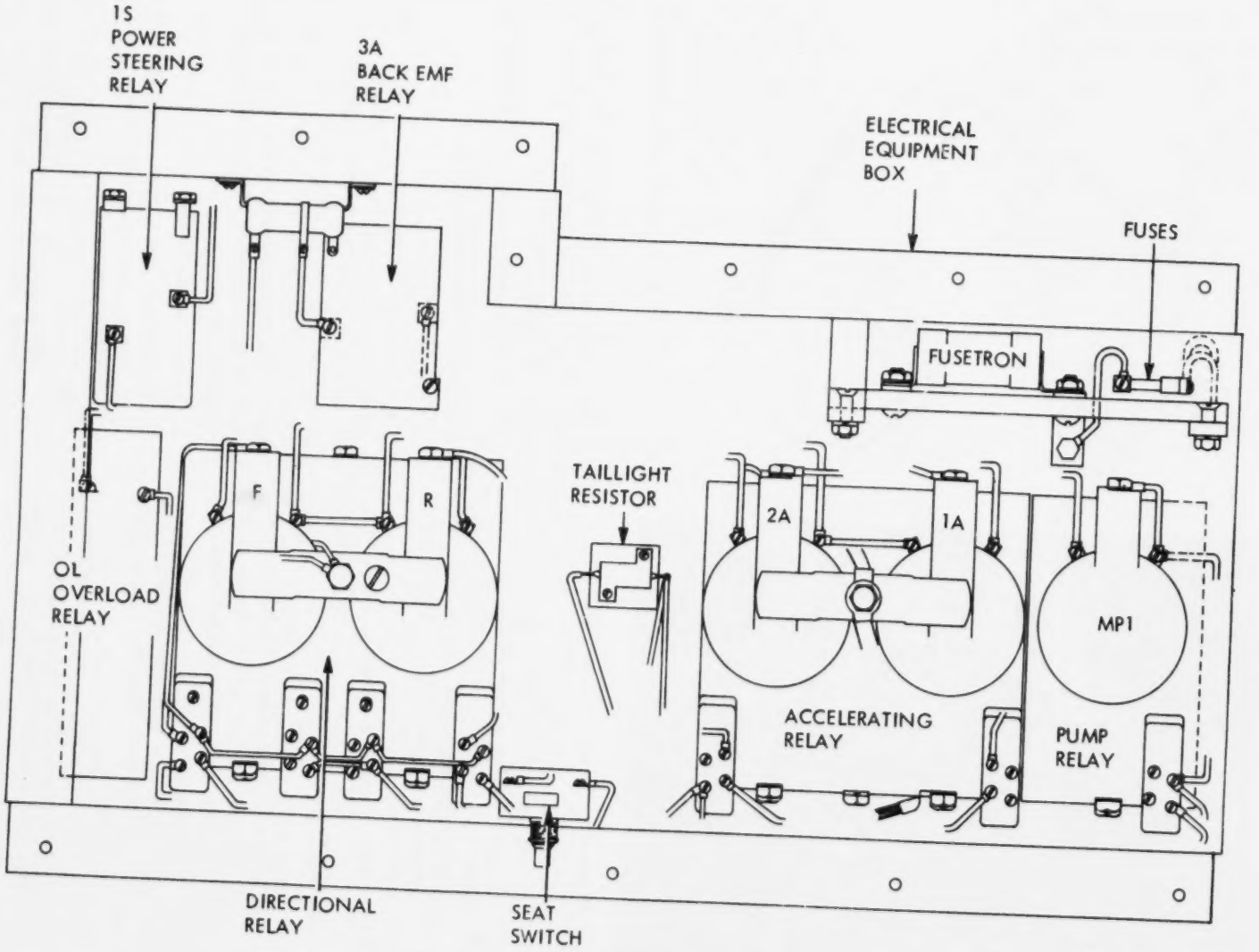


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Figure 34. Electrical equipment box, interior view.

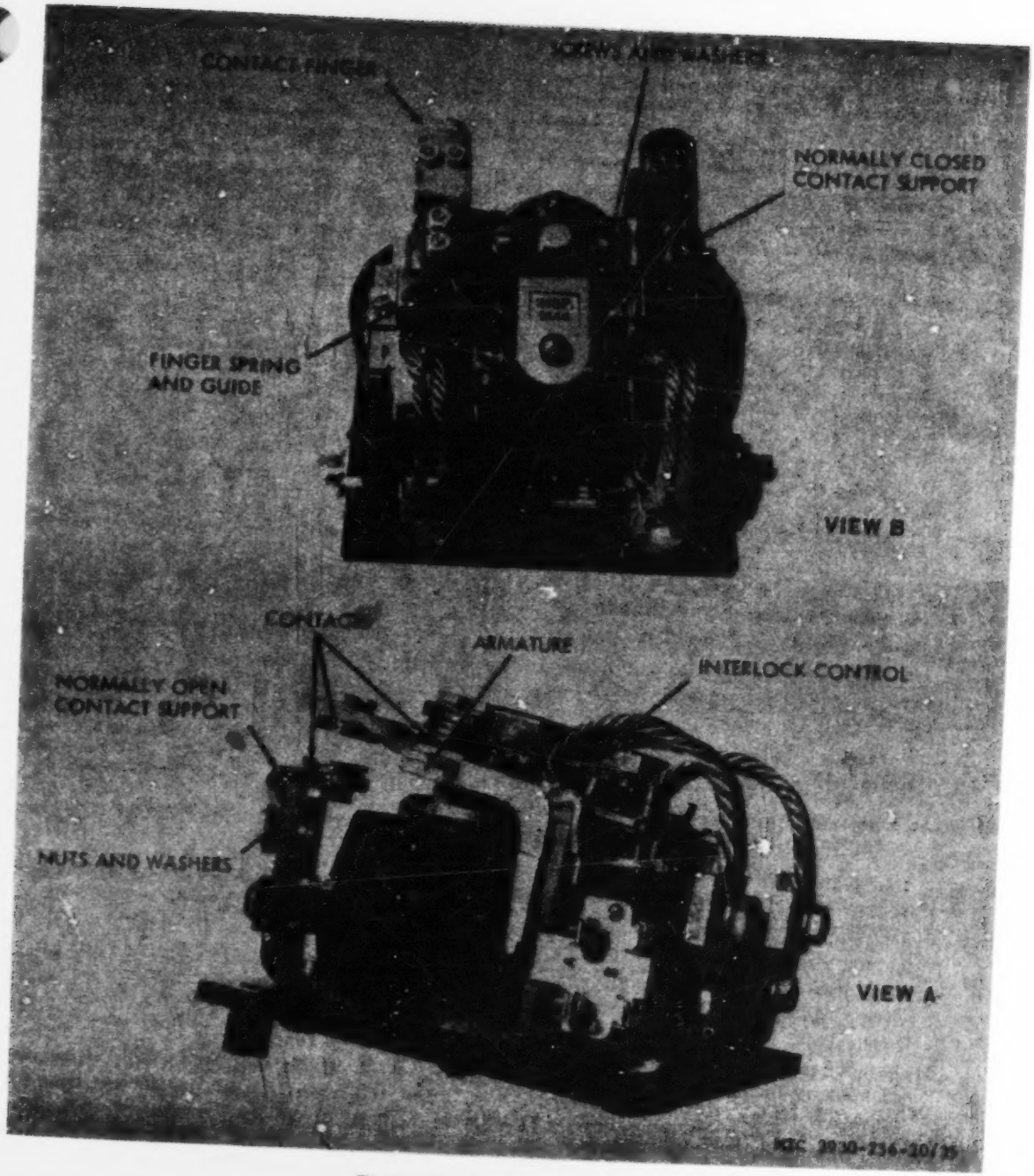

Figure 35. Accelerating relay.

surfaces. Darkening of silver contact material is normal, not a defect. Inspect for loss of contact material, or transfer of metal to a degree that metal remaining may not last until next scheduled inspection. Do not file contacts to recondition.

b. Contact Removal. Removal of contacts is basically the same for all relays to be serviced. Figure 35 shows the accelerating relay. To replace pump relay contacts, disregard (1) below.

(1) Remove screws and washers (fig. 35), and take off n.c. (normally closed) stationary contact support with contacts. Remove nuts and washers and take contacts from support.

(2) Remove screws and washers from each finger spring guide, take off guide, spring, and interlock control. Without disconnecting leads to finger, remove contact nuts and washers and remove movable contacts to be replaced.

(3) Remove nuts and washers, and remove stationary n.o. (normally open) contacts from n.o. contact supports.

c. Contact Installation.

(1) Reverse procedures in *b* above.

(2) Reverse procedure in *a*(1) above.

73. Accelerator Master Assembly

a. Removal.

(1) Removal cover screws (fig. 36) and remove cover.

(2) Disconnect leads inside housing at switch terminal screws (fig. 37). Carefully draw leads out through conduit fitting. Do not remove identification labels from leads.

(3) Remove mounting screws holding base of housing to mounting plate and remove assembly.

b. Repair. The following procedures do not require removal of the assembly.

(1) Remove truck floor plate (para 54).

(2) Remove cover screws and cover (fig. 36).

(3) Disconnect leads at switch to be replaced, remove switch holddown screws, and remove switch.

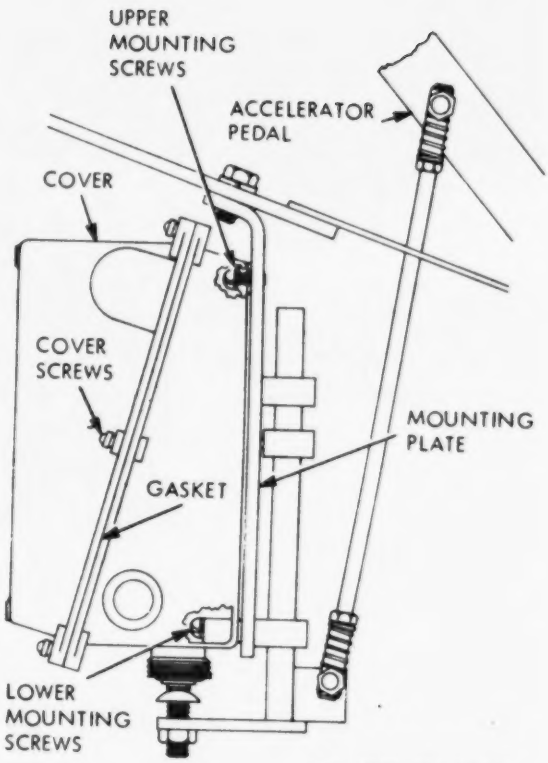

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Figure 36. Accelerator master assembly, installed.

(4) Install new switch by reversing procedures in (1) to (3) above.

c. Adjustment.

(1) Adjust timing of the switch by means of screws on dashpot (fig. 37, view A). The red screw controls the time before reaching speed 2. This time is set at the factory for approximately 0.2 second, which is sufficient time for the directional contactor to close, establishing its holding circuit before the switch reaches speed 2. The white screw controls the timing between speeds 2 and 3. The black screw controls the timing between speeds 3 and 4. These are factory set at about 0.6 second and should be adequate for average application without further

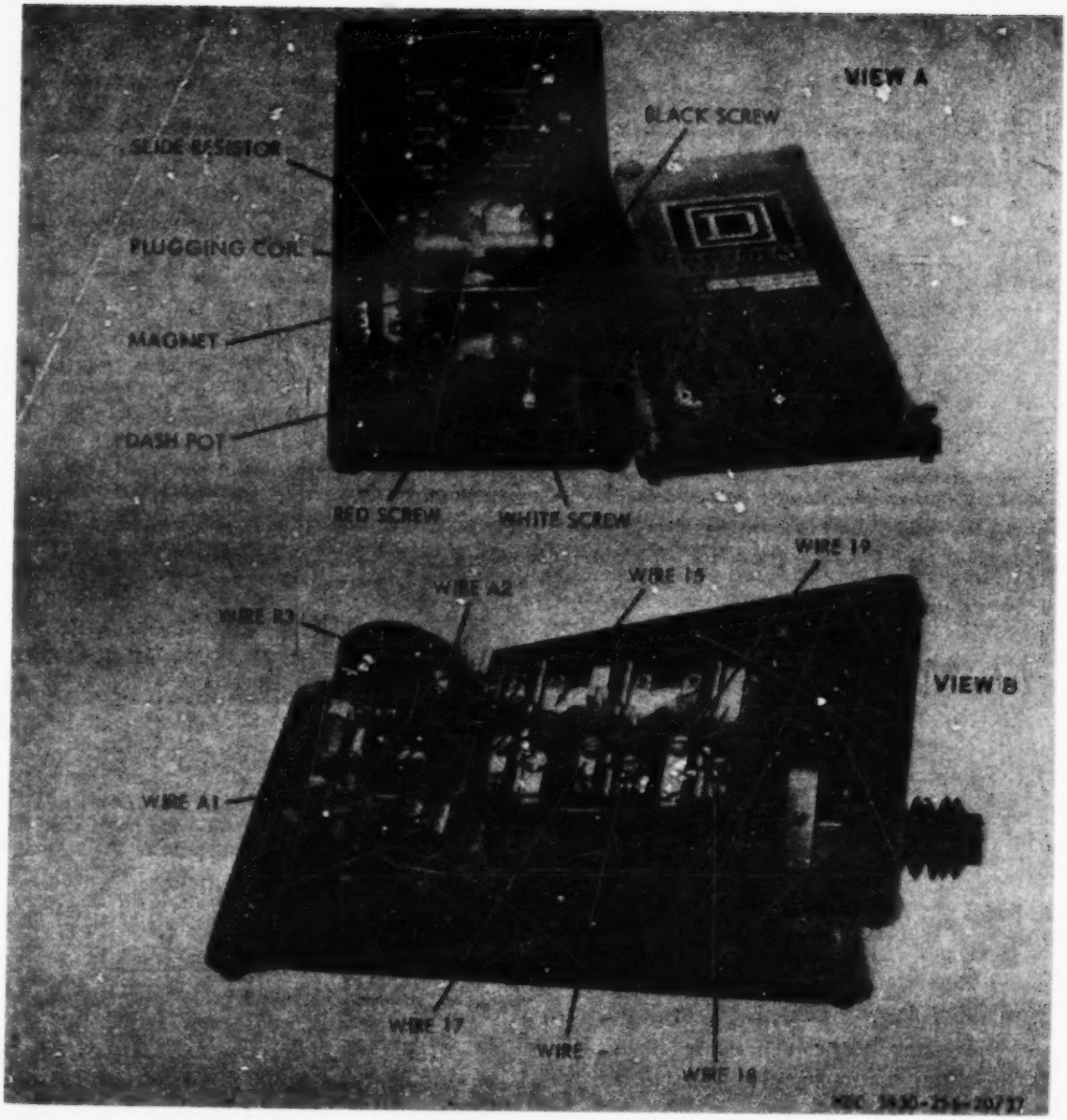


Figure 37. Accelerator master assembly, interior view.

adjustment. Adjusting screws are self-locking by means of a nylon insert.

(2) Adjust slide resistor to obtain release of magnet when brake is on or truck blocked.

d. Cleaning.

(1) If any foreign material is found on the pole face of the permanent magnet (fig. 37, view A), remove with an airhose to insure consistent operation.

(2) If an increase in timing between

speeds occurs, it may be an indication that dashpot and piston require cleaning.

(3) Remove dashpot and 3 colored adjusting screws from dashpot. (Note that screws are of different lengths and must be reassembled in their respective holes.)

(4) Wash dashpot thoroughly in SD and blow out adjusting screw holes with airhose. Wipe parts with solvent (SD) dampened cloth.

(5) Reassemble and adjust screws to give desired timed acceleration (*c*(1) above).

c. Installation. Reverse procedures in *a* above, dressing leads neatly. Connect leads according to the numbers on the label bands on the wires as illustrated in figure 37, view B.

74. Fusetrons

a. Removal.

(1) Remove hood (para 54*a*(1)).

(2) Remove screws and cover plate at top left end of electrical equipment box, to expose fusetrons and fuses (fig. 38).

(3) Remove nuts at each end of fusetron to be replaced and remove fusetron.

b. Installation. Reverse procedures in *a* above.

75. Fuses

a. Removal.

(1) Refer to paragraph 74*a* (1) and (2).

(2) Pull fuse to be replaced straight up from fuse holder.

b. Installation. Reverse procedures in *a* above.

76. Directional Control Switch

a. Removal.

(1) Remove cover screws and cover (fig. 39). Disconnect and tag leads inside control switch.

(2) Disconnect conduit at fitting. Draw leads from control switch.

(3) Remove clamp screws, clamp, and control switch.

Figure 38. Fusetrons and fuses.

b. Installation. Reverse procedures in *a* above, installing leads to terminals from which they were removed.

77. Pump Motor Switch

a. Removal.

(1) Remove cowl (para 54*a*(1)).

(2) Disconnect leads at switch (fig. 25), loosen nut, and screw switch out of bracket.

b. Installation. Reverse procedures in *a* above, screwing switch in to point that levers actuate it.

78. Speed Resistor

This is a two part unit with several taps.

a. Test.

(1) Disconnect and tag leads at resistor taps (fig. 40).

(2) With ohmmeter, measure resistances between taps for values displayed in figure 41.

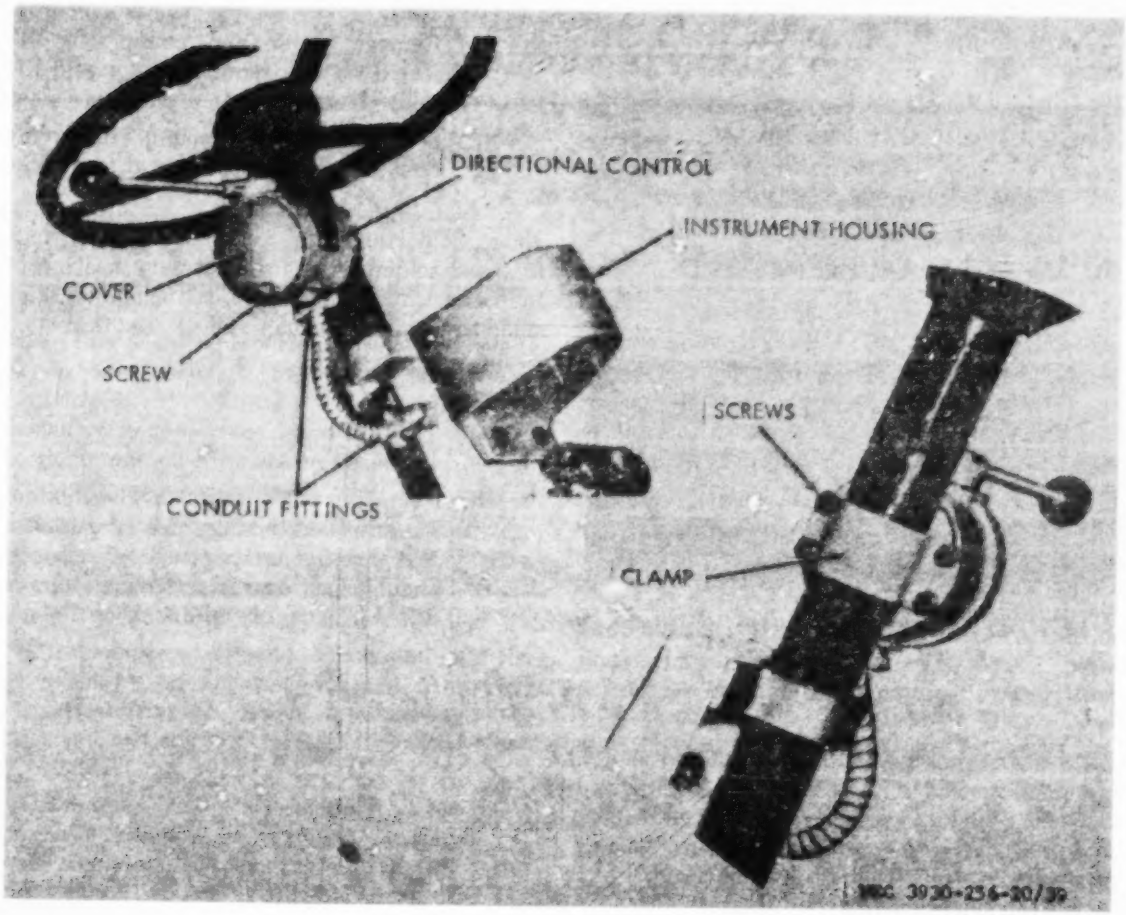


Figure 39. Directional control, right and left views.

b. Removal.

(1) Perform procedure in *a*(1) above.

(2) Remove nuts and washers at end of resistor and lift resistor from truck.

c. Installation. Reverse procedures in *b* above.

79. Thermal Relay

Each motor is protected by a thermal relay which will open the motor circuit if overheating occurs. When temperature sensed by the relay drops to a safe operating value, the relay will automatically close.

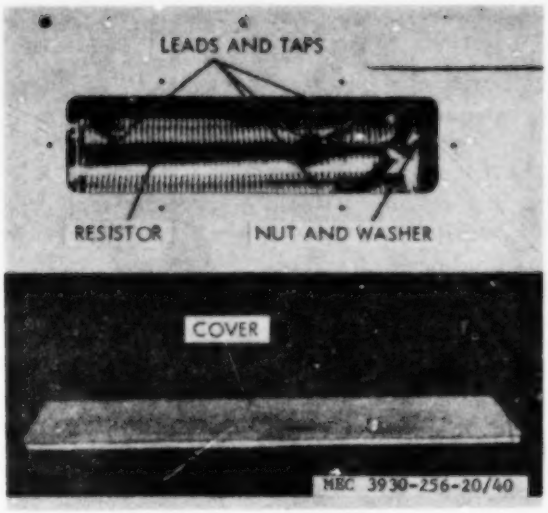


Figure 40. Travel motor resistors, installed.

a. Removal.

(1) Remove screw and clamp (fig. 4) which fastens relay to motor and lift relay from motor.

(2) Scrape sealing compound from relay terminals. Unsolder leads at terminals.

b. Installation. Reverse procedures in *a* above, soldering leads to terminals with rosin flux and solder. Avoid unnecessary heating of the relay while soldering. Coat terminals after soldering with silicone rubber sealing compound.

c. Test.

(1) Test electrical continuity of relay between terminals with an ohmmeter or test light. Test at room temperature.

(2) If controlled temperature is available, test opening temperature of relay. It should open on rising temperature at 224°F., plus or minus 4°.

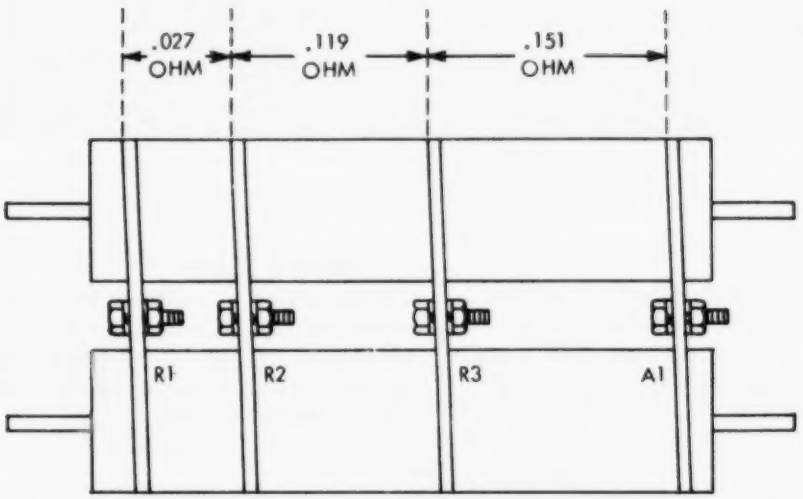


Figure 41. Travel motor resistor test values.

CHAPTER 4
SHIPMENT AND LIMITED STORAGE

Section I. SHIPMENT WITHIN THE ZONE OF INTERIOR

80. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation for domestic shipment are outlined within this paragraph. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. Equipment will be inspected for any unusual conditions such as damage, rusting, accumulation of water, and pilferage. Utilize the inspection criterion provided on the quarterly preventive maintenance services (para 14), to execute DA Form 2404 on the lift truck, as applicable.

c. Cleaning and Drying. Clean and dry the lift truck by an approved method. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38–230.

d. Painting. Paint all surfaces where paint has been removed or damaged. Refer to TM 9–213 for detailed cleaning and painting instructions.

e. Sealing of Openings. Openings that will permit direct entry of water into the interior of the electric motors will be sealed with pressure-sensitive tape conforming to Specification PPP–T–60, type III, class 1.

f. Hydraulic Control Systems, Except Hydraulic Brakes.

(1) Fully retract the lift and tilt pistons as far as the linkage will permit, and secure.

(2) Coat exposed portions of the hydraulic piston rods and operating valve controls with type P–6 preservative conforming to Specification MIL–C–11796, class 3.

(3) Wrap with type I, class 2, grade A, barrier material conforming to MIL–B–121B.

(4) Secure the hydraulic operating valve controls in a neutral position.

g. Exterior Surfaces. Coat exposed machine ferrous metal surfaces with preservative (P–6) conforming to Specification MIL–C–11796, class 3. If preservative is not available, use automotive and artillery grease as specified on the lubrication order.

h. Marking. Markings will conform to MIL–STD–129.

i. Seat Backs and Cushions. Wrap seat backs and cushions in a waterproof barrier material and seal the seams with type III, class 1, pressure-sensitive tape conforming to Specification PPP–T–60.

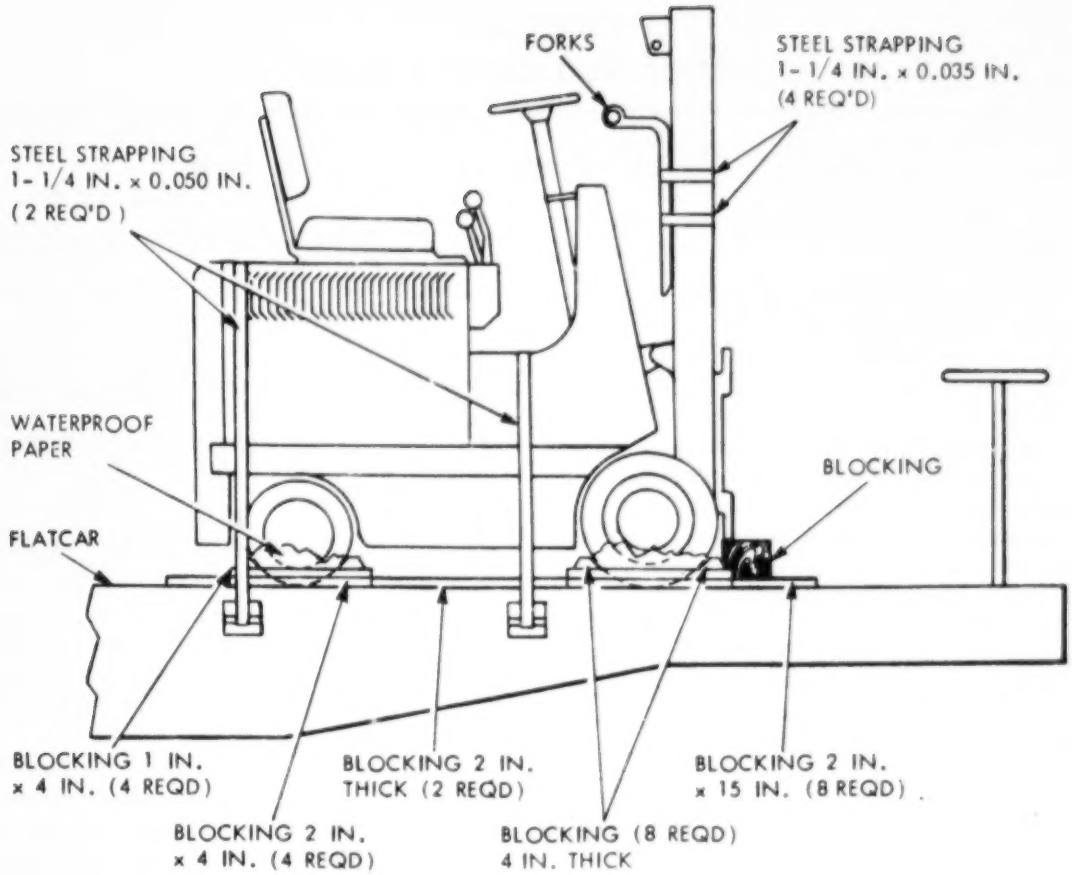
j. Batteries and Cables. When furnished, the battery will be secured in the battery compartment. The battery will be dry and fully charged. Cables will be disconnected, ventholes sealed, and all terminals wrapped and secured with type III, class 1, pressure-sensitive tape conforming to Specification PPP–T–60.

k. Disassembly, Disassembled Parts, and Basic Issue Items.

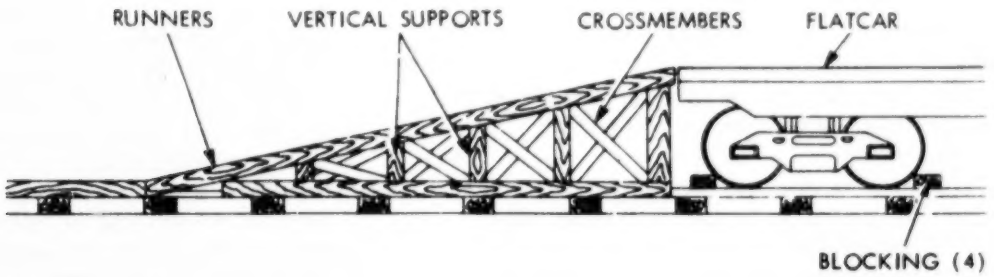
(1) Disassembly will be limited to the removal of parts and projecting components that tend to increase the overall profile of the equipment and that which is subject to pilferage.

(2) Disassembled items will be packed with the publications, in a suitable container and secured to the equipment to prevent loss or pilferage. Refer to TM 38–230 for selection and fabrication of containers.

(3) Forks will be detached and securely strapped to the mast or other suitable



A. BLOCKING, STRAPPING, AND TIEDOWN



B. LOADING RAMP

MEC 3930-256-20/42

Figure 42. Loading truck for shipment.

part of the truck in such a manner as not to cause damage or increase the cube unnecessarily. Flat steel strapping not less than 1¼ inch by 0.035 inch will be used.

81. Loading Equipment for Shipment, Rail or Truck

This paragraph outlines the requirements for loading and blocking truck. A flatcar is illustrated; however, if shipment is by truck or boxcar, adapt these instructions to suit the carrying vehicle with no more than essential deviations.

a. Loading.

(1) Lift truck onto flatcar with a hoist rated at 4 tons or greater, or

(2) Construct a ramp as shown in figure 42 and drive or pull truck up ramp.

Caution: **Be very careful aboup tipping on ramp.**

b. Blocking. Block, strap, and tie down truck as shown in figure 42.

Section II. LIMITED STORAGE

82. Preparation of Equipment for Limited Storage

a. Ceneral. Detailed instructions for preserving and maintaining equipment in limited storage are outlined in this paragraph. Limited storage is defined as storage not to exceed 6 months. Refer to AR 743–505.

b. Inspection. Equipment will be inspected for any unusual conditions such as damage, rusting, accumulation of water, and pilferage. Utilize the inspection criterion provided on the quarterly preventive maintenance services (para 14) to execute DA Form 2404 on the lift truck, as applicable.

c. Cleaning and Drying. Clean and dry the lift truck by an approved method. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38–230.

d. Painting. Paint all surfaces where paint has been removed or damaged. Refer to TM 9–213 for detailed cleaning and painting instructions.

e. Sealing of Openings. Openings that will permit direct entry of water into the interior of the electric motors will be sealed with pressure-sensitive tape, conforming to Specification PPP–T–60, type III, class 1.

f. Hydraulic Control Systems, Except Hydraulic Brakes.

(1) Fully retract the piston as far as the linkage will permit and secure.

(2) Coat exposed portions of the hydraulic piston rods and operating valve controls with type P–6 preservative conforming to Specification MIL–C–11796, class 3.

(3) Wrap with type I, class 2, grade A, barrier material conforming to Specification MIL–B–121B.

g. Exterior Surfaces. Coat exposed machine ferrous metal surfaces with preservative (P–6) conforming to Specification MIL–C–11796, class 3. If preservative is not available, use automotive and artillery grease as specified on the lubrication order.

h. Seat Backs and Cushions. Wrap seat backs and cushions in a waterproof barrier material and seal the seams with type III, class 1, presure-sensitive tape conforming to Specification PPP–T–60.

i. Batteries and Cables. The battery will be secured in the battery compartment. The battery will be filled and fully charged. Cables will be disconnected, ventholes sealed, and all terminals wrapped and secured with type III, class 1, pressure-sensitive tape conforming to Specification PPP–T–60.

j. Disassembly, Disassembled Parts, and Basic Issue Items.

(1) Disassembly will be limited to the removal of parts and projecting components that tend to increase the overall profile of the equipment and that which is subject to pilferage.

(2) Disassembled items will be packed with the publications in a suitable container and secured to the equipment to prevent loss or pilferage. Re-

fer to TM 38–230 for selection and fabrication of containers.

k. Weatherproofing. Warehouse storage is preferred for the truck. If this is not available, select a firm, level, well-drained location. Place truck on heavy planking or other solid surface. Cover truck with tarpaulin or other waterproof material and tie down securely.

83. Inspection and Maintenance of Equipment in Storage

a. Inspection. When equipment has been placed in limited storage all scheduled preventive maintenance services, including inspection, will be suspended and preventive maintenance inspection will be performed as specified herein. Refer to AR 743–505.

b. Worksheet and Preventive Maintenance. Applicable forms listed in TM 38–750 will be prepared for each major item of equipment every 90 days while in limited storage. Perform required maintenance promptly to make sure equipment is mechanically sound and ready for immediate use.

c. Operation. Operate equipment in limited storage long enough to insure complete lubrication of all bearings, gears, and the like, every 90 days. Equipment must be serviced and in satisfactory condition before it is operated. After each operating period, represerve the truck as outlined in paragraph 82.

APPENDIX I
REFERENCES

AR 320–5	Dictionary of United States Army Terms
AR 320–50	Authorized Abbreviations and Brevity Codes
AR 700–58	Report of Damaged or Improper Shipment
AR 700–3900–5	Registration of Materials Handling Equipment and Special Purpose Vehicles
AR 746–5	Color and Marking of Army Materiel
AR 750–3900–1	Materials Handling Equipment
AR 750–5	Organization, Policies, and Responsibilities for Maintenance Operations
DA Pam 108–1	Index of Army Motion Pictures, Film Strips, Slides, Tapes, and Phono-Recordings
DA Pam 310–1	Military Publications: Index of Administrative Publications
DA Pam 310–2	Military Publications: Index of Blank Forms
DA Pam 310–3	Military Publications: Index of Doctrinal, Training, and Organizational Publications
DA Pam 310–4	Military Publications: Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8, and 9), Supply Catalogs (type CL), Supply Bulletins, Lubrication Orders, and Modification Work Orders
FM 21–5	Military Training Management
FM 21–6	Techniques of Military Instruction
FM 21–30	Military Symbols
LO 10–3930–256–20	Lubrication Order; Truck, Lift, Fork, Electric, Solid Rubber Tires, 6000-Pound Capacity, Army Model MHE–198, Baker Model FTD–060–EE, Federal Stock Number 3930–724–4057 (130-in. lift), Federal Stock Number 3930–724–4059 (172-in. lift)
MIL–STD–162A	Preparation for Delivery of Warehouse Materials Handling Equipment for Domestic and Oversea Shipment and Storage
SB 5–111	Supply of DA Approved Fire Extinguishers to Army Troop Users
TM 9–213	Painting Instructions for Field Use
TM 10–3930–256–10	Operator's Manual; Truck, Lift, Fork, Electric, Solid Rubber Tires, 6000-Pound Cacapity, Army Model MHE–198, Baker Model FTD–060–EE, Federal Stock Number 3930–724–4057 (130-in. lift), Federal Stock Number 3930–724–4059 (172-in. lift)
TM 10–3930–256–20P	Organizational Maintenance Repair Parts and Special Tool Lists; Truck, Lift, Fork, Electric, Solid Rubber Tires, 6000-Pound Capacity, Army Model MHE–198, Baker Model FTD–060–EE, Federal Stock Number 3930–724–4057 (130-in. lift), Federal Stock Number 3930–724–4059 (172-in. lift)
TM 5–764	Electric Motor and Generator Repair
TM 10–1690A	Industrial Motive Power Storage Batteries for Material Handling Equipment

TM 21–300	Driver Selection and Training (Wheeled Vehicles)
TM 38–230	Preservation, Packaging, and Packing of Military Supplies and Equipment
TM 38–750	Army Equipment Record Procedures

APPENDIX II
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix contains the explanations of all the maintenance and repair functions authorized the various maintenance levels.

b. Section II contains the maintenance allocation chart (MAC) designating overall responsibility for the performance of maintenance functions.

2. Maintenance

Maintenance is any action taken to keep material in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of material includes the following:

a. Service. Operations required periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and deicing fluids or compressed air supplies.

b. Adjust. Regulate periodically to prevent malfunction. Adjustments will be made commensurate with adjustment procedures and associated equipment specifications.

c. Aline. Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

d. Calibrate. Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

e. Inspect. Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

f. Test. Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Tests will be made commensurate with test procedures and with calibrated tools and/or test equipment referenced on the MAC.

g. Replace. Substitute serviceable components, assemblies and subassemblies for unserviceable counterparts or remove and install the same item when required for the performance of other maintenance operations.

h. Repair. Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills to include welding, grinding, riveting, straightening, adjusting and facing.

i. Overhaul. Restore an end item to completely serviceable condition as prescribed by serviceability standards. This is accomplished through employment of the technique of "Inspection and repair only as necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul. Overhaul may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

j. Rebuild. Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassemble using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

3. Explanation of Columns

a. Functional Group. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance

with their function and [illegible]nity to each other.

b. Component Assembly Nomenclature. This column contains the functional grouping index heading, subgroups heading, and a brief description of the part starting with the noun name.

c. Essentiality. The essentiality column reflects whether or not an assembly is combat essential to the tactical use of the end item. The letter "E" in this column indicates the items are combat essential.

d. Maintenance Operations and Maintenance Levels. This column contains the various maintenance operations "A" through "J," service, adjust, etc. A letter indicating the maintenance level placed in the appropriate column in line with an indicated maintenance operation authorizes that level to perform the function. The letter indicates the lowest level of maintenance responsible for performing the function, but does not necessarily indicate repair parts stockage at that level. Higher levels of maintenance are authorized to perform the indicated functions of lower levels. This column contains the various maintenance levels by letter designation.

O/C—Operator or crew
O —Organizational
DS —Direct Support
GS —General Support
D —Depot

Section II. MAINTENANCE ALLOCATION CHART

Functional group	Component assembly nomenclature	Essentiality	Maintenance function									
			A	B	C	D	E	F	G	H	I	J
			Service	Adjust	Aline	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild
06	ELECTRICAL SYSTEM											
0607	Instrument Panel											
	Hourmeter						O		O			
0608	Miscellaneous Items											
	Switch, stoplight						O		O			
0609	Lights											
	Headlight								O	O		
	Light, tail and stop								O	O		
	Resistors, light							O	O			
0610	Horn							O	O			
0612	Batteries		O/C						O			
0613	Hull or Chassis Wiring Harness											
	Wiring, head, tail, stoplight								DS	O		
10	FRONT AXLE											
1000	Front Axle Assembly											
	Power axle assembly		O						DS	DS	GS	
1002	Differential											
	Differential and drive gear								DS	GS		
11	REAR AXLE											
	Axle assembly, steering			O					DS	DS		
1104	Steering											
	Knuckle, steering		O						O			
12	BRAKES											
1201	Handbrakes											
	Cable, brake			O					O			
1202	Service Brakes											
	Brake assembly			O					DS	DS		
1204	Hydraulic Brake System											
	Master cylinder		O						O	DS		
	Wheel cylinder assembly								DS	DS		

Functional group	Component assembly nomenclature	Essentiality	Maintenance function									
			A	B	C	D	E	F	G	H	I	J
			Service	Adjust	Aline	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild
13	WHEEL											
1311	Wheel Assembly											
	Bearings, wheel, rear		O						O			
14	STEERING											
1401	Steering Assembly											
	Steering gear assembly		O	O					DS	DS		
1410	Hydraulic Pump											
	Pump assembly, steering								O	DS		
1413	Tanks; Reservoirs											
	Reservoir		O						DS			
1806	SEATS											
	Seat assembly								O	O		
24	HYDRAULIC LIFT COMPONENTS											
2401	Hydraulic Pump											
	Pump assembly, hydraulic								O	DS		
2402	Hydraulic Control Valve											
	Valve, control								O	DS		
2404	Hydraulic Tilt Cylinders											
	Cylinder assembly, tilt								O	DS		
2405	Hydraulic Mast Column											
	Cylinder, hoist								DS	DS		
	Chain assembly			O					O	O		
2406	Hydraulic Lines and Fittings											
	Tank, oil		O						DS			
	Cap, oil breather		O/C						O			
40	ELECTRIC MOTORS											
4000	Motor											
	Motor, travel							DS	DS	DS	GS	
	Motor, pump							O	O	DS		
	Motor, steering							O	O	DS		
4001	Motor Assemblies											
	Armature, travel motor							DS	DS	DS		
	Armature, pump motor							DS	DS	DS		
	Armature, steering pump motor							DS	DS	DS		
4002	Stator Assemblies											
	Coils, field, travel motor							DS	DS	DS		
	Coil assembly, field, pump motor							DS	DS	DS		
	Frame and field assembly, steering pump motor.							DS	DS	DS		
4010	Master or Auxiliary Control Assembly											
	Contractors								DS	O		
	Accelerator master assembly								O	O		
4012	Switches											
	Switch, directional								O	DS		
4014	Resistors											
	Resistors, speed							O	O			
4015	Relay or Assembly											
	Thermal relay							O	O			
76	FIRE FIGHTING EQUIPMENT COMPONENTS											
7603	Extinguisher, fire						O/C		O/C			

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By Order of the Secretary of the Army:

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General, United States Army,
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NG: State AG (3).

USAR: None.

For explanation of abbreviations used, see AR 320-50.

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SAFETY PRECAUTIONS

Operation

Refer to TM 10–3930–256–10 for safety precautions to be observed during operation of the forklift truck.

Hydraulic System

Before working on any part of the hydraulic system, be sure—

1. Lift carriage is fully lowered.
2. Mast is tilted fully DOWN.
3. All hydraulic pressure is relieved from unit or hose to be serviced.
4. All personnel and materiel are clear, should some system be operated accidentally.
5. Disconnect battery at charging receptacle, except when battery power is required to support the maintenance being done.

Electrical System

1. Avoid contact with spilled electrolyte. It is corrosive to most metals and fabrics and can burn skin if not washed off immediately with running water.
2. Be careful of flame, smoking, or creating sparks by short circuiting near charging or recently charged batteries. Hydrogen gas given off during charging is explosive and easily ignited.
3. Disconnect battery at charging receptacle except when battery is needed to support maintenance being done.
4. Remove rings, metal watch bands, or any object which might short across the electrical circuit. Serious burns can result, and equipment can be damaged, if this is not done.